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ANALYSIS OF OPERATIONAL REQUIREMENTS FOR MEDIUM DENSITY AIR TRANSPORTATION

APPENDIX

VOLUME III
MARCH 1975

PREPARED UNDER CONTRACT NO. NAS2-8135
FOR
SYSTEMS STUDIES DIVISION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MOFFETT FIELD, CALIFORNIA 94035

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FOREWORD

This Volume III contains the supporting data to Volume II, Final Report, of a contracted study performed for NASA, "Analysis of Operational Requirements for Medium Density Air Transportation", by the Douglas Aircraft Company, McDonnell Douglas Corporation.

The NASA Technical Monitors for the study were Thomas L. Galloway and Susan N. Norman, Systems Studies Division, Ames Research Center, Moffett Field, California.

The Douglas Study Team consisted of J. Seif, Technical Director, assisted by M. A. Sousa, responsible for Aircraft Analysis, and S. C. Nelson, responsible for Systems Operations and Economic Analysis. The following personnel contributed to the study effort in the disciplines as indicated:

Acoustics	:	J. J. Heffernan
Aerodynamics	:	R. D. Walls, J. H. Lindley
Economics	:	J. C. Van Abkoude
Environment	:	L. H. Quick
Manufacturing	:	F. J. Mikkelsen
Market	:	G. R. Morrissey
Power Plant	:	F. S. LaMar
Weights	:	B. W. Kimoto, J. L. Weinberg

The subcontractor participation included the following companies and personnel:

Air California	:	F. R. Davis
American Airlines	:	J. D. Graef
Cessna Aircraft	:	O. D. Mall
North Central Airlines	:	C. B. Vesper

Appreciation for their cooperation and contribution is extended to:

Avco Lycoming Division
Avco Corporation

Detroit Diesel Allison Division
General Motors Corporation

General Electric Company
Aircraft Engine Group

Hamilton Standard Division
United Aircraft Corporation

The nine month study, initiated in March 1974, was divided into three tasks: Task I - Aircraft Requirements; Task II - Aircraft Design Study; and Task III - Evaluation.

The final report for this study is presented in three volumes as follows:

Volume I Summary	-	A summary of the significant study results
Volume II Final Report	-	A detail description of the study and results
Volume III Appendix	-	The supporting study data, methods, and analyses.

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APPENDIX A — AIRCRAFT

A.1 PERFORMANCE ANALYSIS METHODS AND GROUND RULES

A.1.1 Aircraft Sizing

The sizing process is illustrated by figure A-1. Thrust-to-weight and wing loading combinations which satisfy the takeoff and landing field length requirements together with parametric weight data ($OEW = f(TOGW, W/S, T/W)$), installed thrust and tail sizing information are used as inputs to a computer program which performs the aircraft sizing calculations. A typical mission profile used for airplane sizing is shown in figure A-2.

A.1.2 Takeoff

STOL takeoff performance was estimated by calculating the time history of the takeoff flight path. This method allows for recognition of changes in aerodynamic characteristics and flight limitations which occur during the maneuver. The calculations are governed by the following assumptions:

1. The aircraft is assumed to be a point mass, i.e., second-order rotational dynamics have been ignored and the analysis is essentially two dimensional.
2. The forces acting on the aircraft are summed in the longitudinal and normal directions and are a function of true airspeed, flight path angle, angle of attack and height above the ground.
3. Any restriction on speed, acceleration, attitude, etc., may be imposed as desired.
4. The path is generated by numerical integration of the forces acting on the aircraft over small increments in time using a digital computer.

Based on FAR Part 25 requirements, takeoff field length was defined as the greater of:

AIRCRAFT SIZING PROCESS

A-2

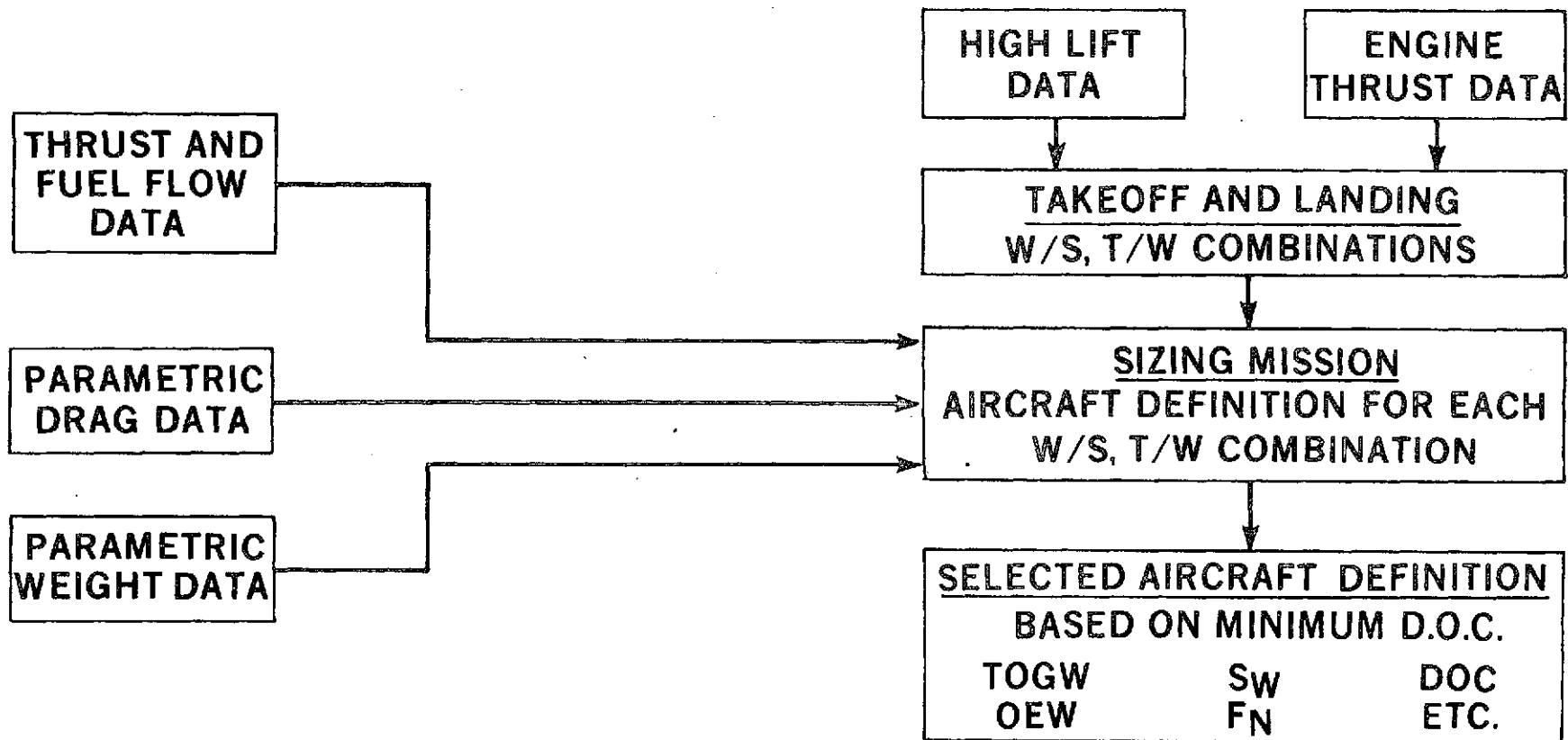
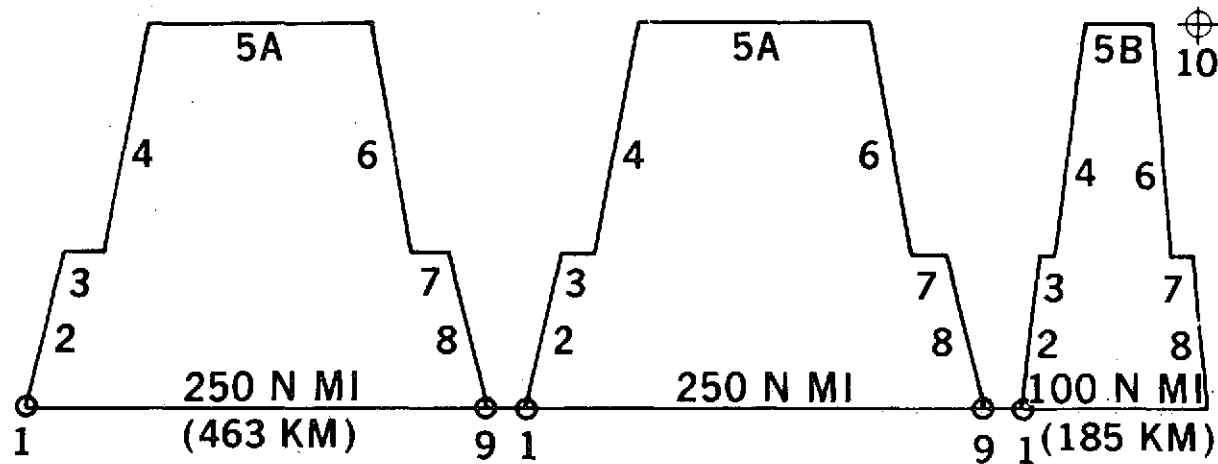


FIGURE A-1

SIZING MISSION PROFILE



1. TAXI-OUT (3 MINUTES) AND TAKEOFF AND ACCELERATE TO BEST CLIMB SPEED (2 MINUTES)
2. CLIMB AT 250 KIAS (129 M/S) TO 10,000 FT (3048 M)
3. ACCELERATE TO CLIMB SPEED
4. CLIMB AT 300 KIAS (154 M/S) TO CRUISE ALTITUDE
- 5A. CRUISE AT MAX MACH NO. AT \leq 25,000 FT (7620 M)
- 5B. CRUISE AT 99 PERCENT MAX SPECIFIC RANGE
6. DESCEND TO 10,000 FT (AT FLIGHT IDLE, INCL 300 KIAS PRESSURIZATION CABIN RATE LIMITED DESCENT).
7. DECELERATE TO 250 KIAS
8. DESCEND AT 250 KIAS TO S.L.
9. APPROACH AND LAND (3 MINUTES) AND TAXI-IN (2 MINUTES)
10. HOLD (45 MINUTES) AT MAX ENDURANCE

FIGURE A-2.

1. 1.15 x all-engine takeoff distance to 35 feet (10.7 m) height.
2. Distance to 35 feet (10.7m) height with critical engine failure at V_1 .
3. Distance to accelerate to V_1 and then decelerate to a stop.

The following constraints were used in calculating the takeoff field lengths for the final design aircraft.

1. Rolling friction, $\mu = 0.025$.
2. Fuselage angle of attack \leq ground limit = 15° .
3. Rotation rate, $\theta \leq 5^\circ/\text{sec}$.
4. $C_L \leq 90\%$ of $C_{L_{\max}}$ out of ground effect.
5. $C_L \leq 100\%$ of $C_{L_{\max}}$ in ground effect.
6. No deceleration during air run to 35 feet (10.7m) height.
7. Early rotation at a speed of 5 knots (2.57 m/sec) less than the design rotation speed will not result in an increase in the one-engine-out takeoff distance.
8. Accelerate-stop distance based on one second delay to recognize an engine failure at V_1 plus a three second delay to initiate braking followed by a deceleration of 0.425g to a stop.
9. Second segment climb gradient (at V_2 , with takeoff flap setting, critical engine inoperative, gear up and out of ground effect)
 - \geq 3.0% for four-engine aircraft
 - \geq 2.4% for two-engine aircraft

A-1.3 Landing

The methods and assumptions used in calculating landing field lengths are essentially the same as those used for takeoff performance. The landing maneuver consists of three segments; approach, flare and ground roll as shown in figure A-3. Landing field length is defined as the landing distance over a 50-foot (15.2 m) obstacle divided by a 0.6 factor, i.e., a 4500-foot (1372 m) field length requires a landing distance of 2700 feet (823 m).

LANDING FIELD LENGTH DEFINITION

A-5

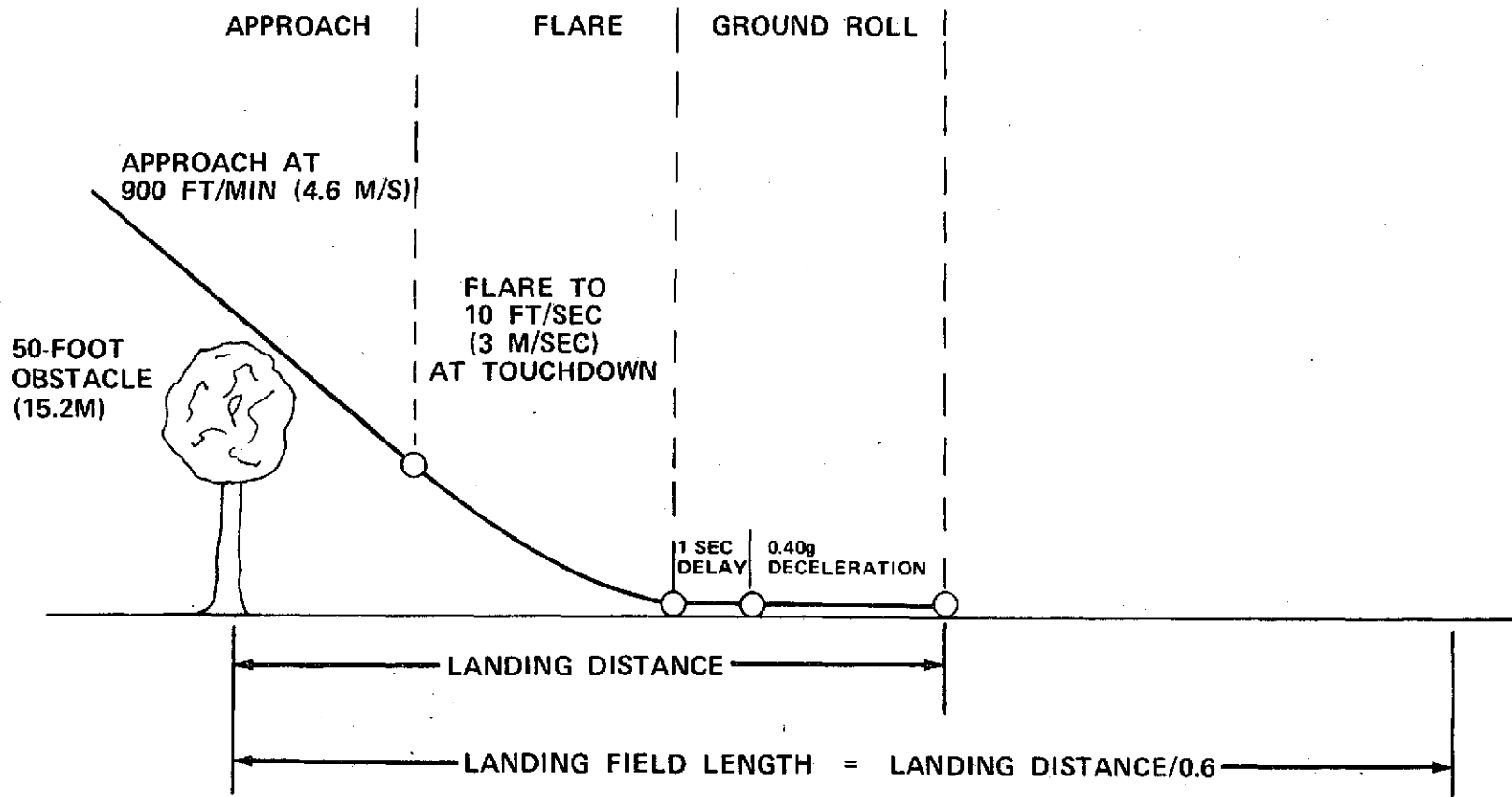


FIGURE A-3.

The approach conditions were:

1. $1.3 V_{\min}$ approach speed at 50° (0.873 rad) flap setting.
2. 900 fpm (4.57 m/sec) approach sink rate.

The flare maneuver was performed by rotating the aircraft $5^\circ/\text{sec}$ (0.087 rad/sec) starting at the flare height. As the aircraft approaches the ground C_L and C_D tend to diminish due to ground effect. The flare height was selected to yield a touchdown sink rate of 10 fps (3 m/sec).

The ground roll consists of one second at constant speed from touchdown to deceleration device effectiveness followed by a constant deceleration of 0.40g to a stop. Landing, like takeoff, was calculated for sea level, 90°F (32.2°C) conditions.

A.1.4 Mission

The mission calculations, for the mission profile previously shown in Section A.1.1; figure A-2, are performed in a computer program specifically developed by Douglas Aircraft Company during the last five years for the sizing of aircraft in the advanced design stage. The methods used are essentially those of classical airplane performance. The computer program calculates 2 degrees-of-freedom mission time histories, iterating on weight, thrust, drag and tail sizing data to determine such characteristics as TOGW, wing area, engine size, OEW, fuel burned, etc. of an aircraft which satisfies the requirements of the mission profile with the desired payload.

Cruise altitude, not exceeding 25,000 feet (7620 m), and climb Mach number were optimized to minimize DOC. Mission performance was calculated for standard day conditions.

A.2 AERODYNAMIC CHARACTERISTICS

A.2.1 High Lift Configuration Aerodynamic Characteristics

A.2.1.1 Nominal High-Lift System — Turbofan Aircraft

The nominal flap aircraft utilize the DC-9-30 leading edge slat and trailing edge flap concept; see figure A-4. Basic DC-9-30 longitudinal high-lift characteristics were adjusted to a lower quarter chord sweep of 5 degrees (0.087 rad) using Douglas developed analytical and empirical methods. Differences in flap effected area and wing aspect ratio between the DC-9-30 and the nominal flap aircraft were small and offsetting, so were neglected. The estimated out-of-ground effect longitudinally trimmed lift-and-drag characteristics for the nominal flap aircraft are presented in figure A-5. The maximum lift coefficients for determining the l_g and V_{min} stall speeds are presented in table A-1. The estimated engine-out lateral-directional trim increments used in the performance analysis are based on Douglas-derived analytical and empirical methods which have shown good correlation with flight test data. The equation form used for calculating these increments is shown below in table A-2.

A.2.1.2 Nominal High-Lift System — Turboprop Aircraft

The basic high-lift configuration consists of a full span slat and double slotted trailing edge flap similar to that used on the turbofan nominal flap configuration, Section A.2.1.1. Low speed aerodynamic power effects were estimated from Datcom analytical methods and applicable wind tunnel data, which were used to refine the Datcom methods to apply more specifically to the particular turboprop configuration for this study. The refined methods account for engine-out span load distortions which produce a loss of powered lift efficiency and increased induced drag at a given level of lift.

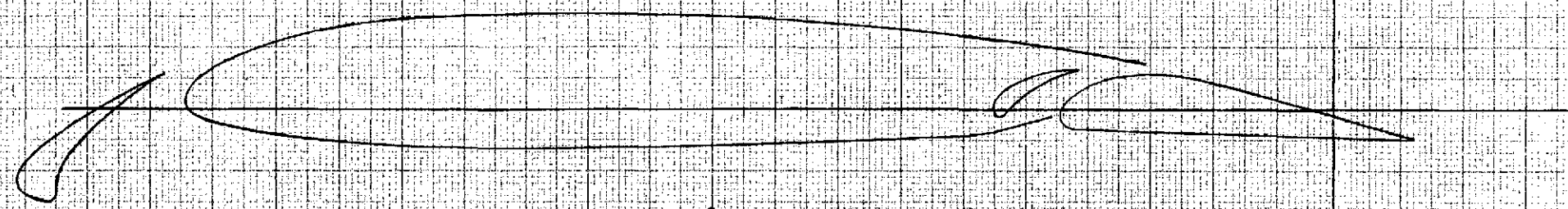


NOMINAL DC-9-30 TYPE HIGH LIFT SYSTEM

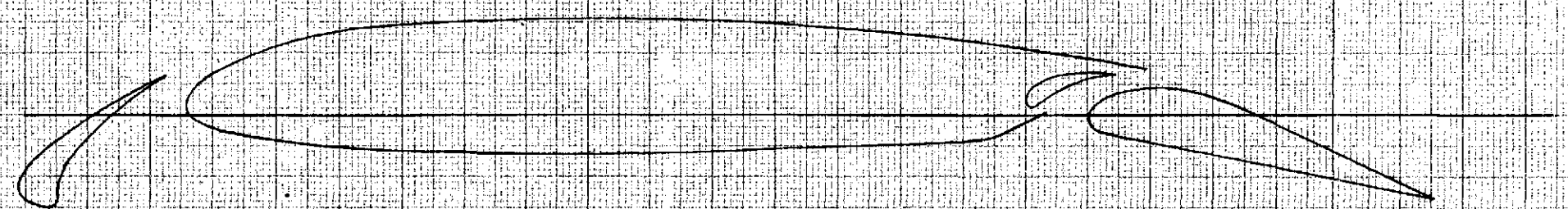
SUPER CRITICAL WING NOT REPRESENTED

$(C_F/C)_{NESTED} \approx .30$

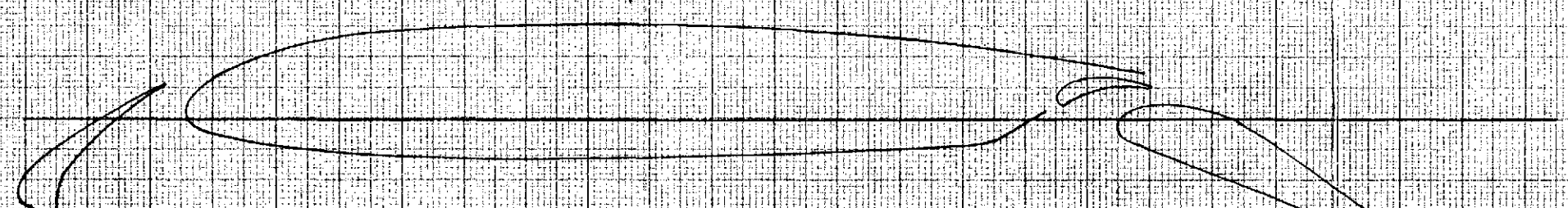
$S_F = 5^\circ$



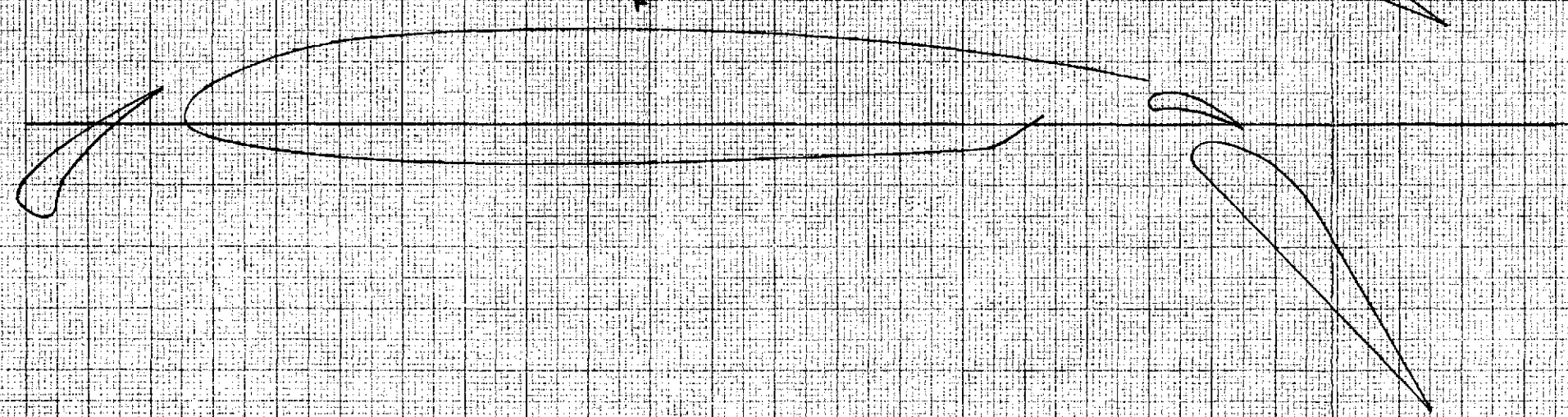
$S_F = 15^\circ$



$S_F = 25^\circ$



$S_F = 50^\circ$



0 10 20 30 40 50 60 70 80 90 100
PERCENT WING CHORD

FIGURE A-4



NOMINAL FLAP - BASELINE, 50 PASSENGER TURBOFAN
 TRIMMED LIFT AND DRAG CHARACTERISTICS
 FULL SPAN LEADING EDGE SLAT
 ADJUSTED TO FLT. REYNOLDS NO.
 GEAR DOWN, CG = .25 MAC

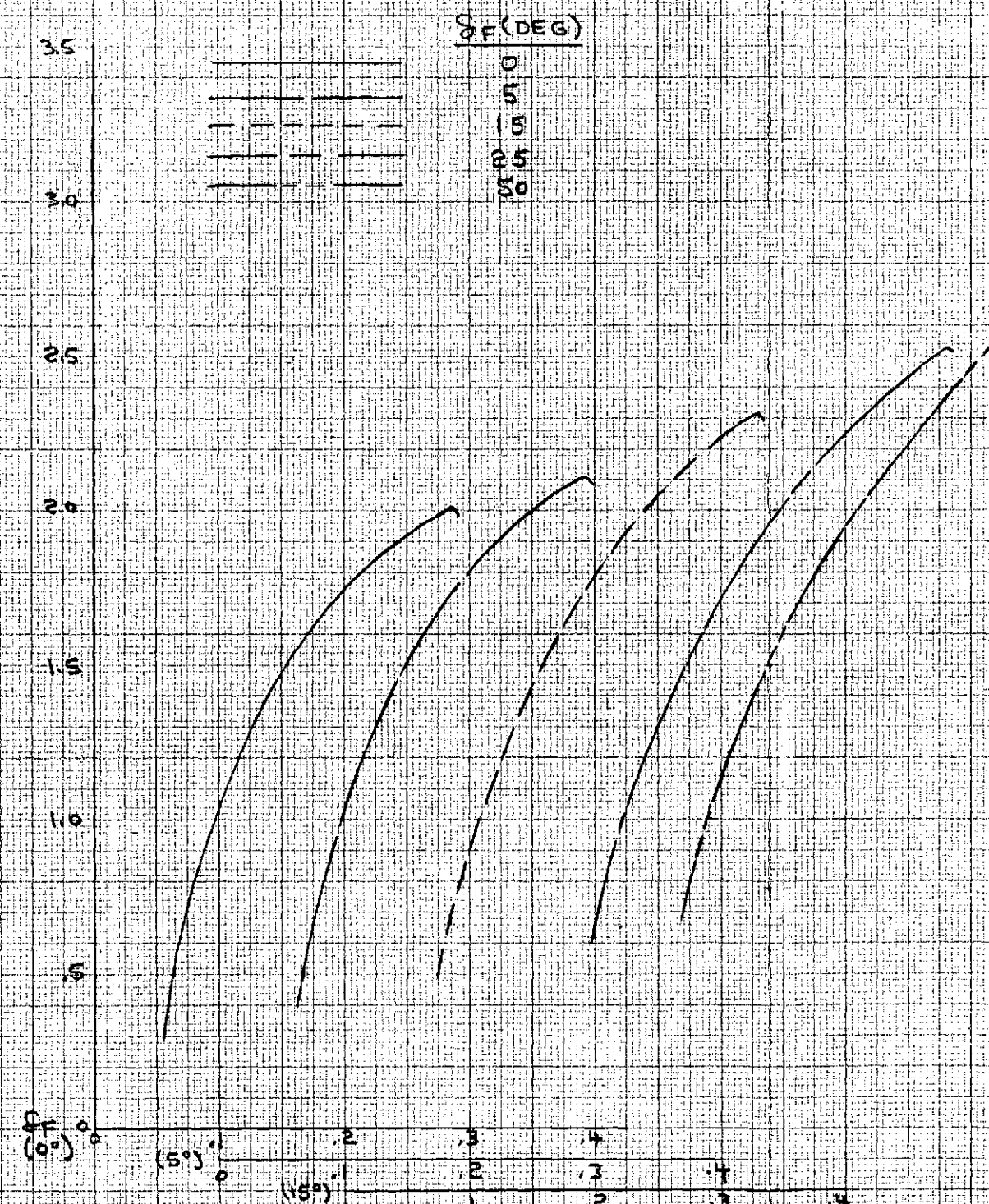
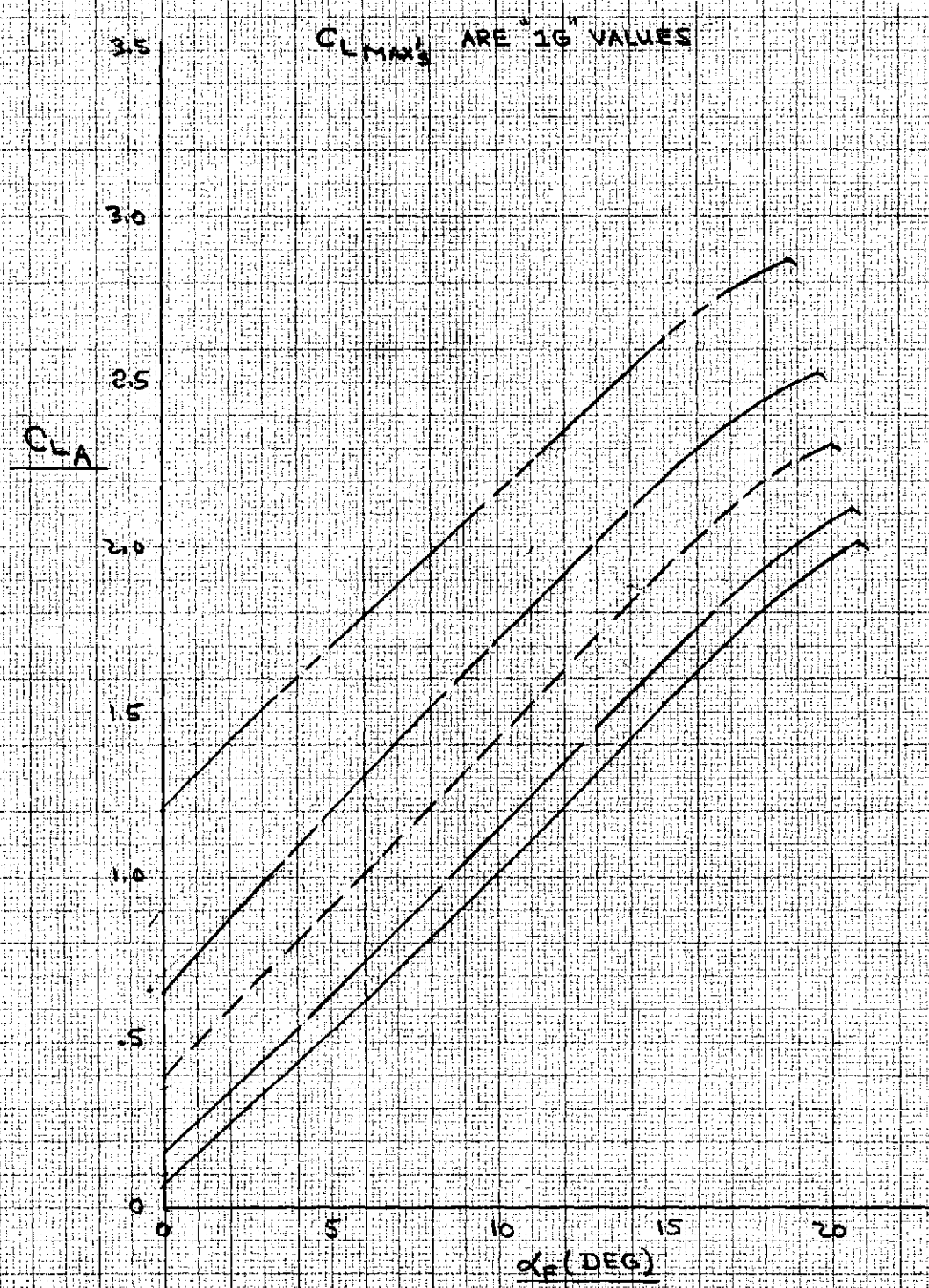


FIGURE A-5

FOLDOUT FRAME

FOLDOUT FRAME

TABLE A-1

NOMINAL HIGH LIFT SYSTEM, MAXIMUM LIFT COEFFICIENTS

<u>FLAP ANGLE (degrees/radians)</u>	<u>$C_{L_{M_{ig}}}$</u>	<u>$C_{L_{M_{vmin}}}$</u>
0/0	2.01	2.08
5/0.087	2.11	2.24
15/0.262	2.32	2.46
25/0.436	2.52	2.63
50/0.873	2.87	3.00

TABLE A-2

ENGINE-OUT LATERAL-DIRECTIONAL TRIM INCREMENTS-TURBO-AN AIRCRAFT

$$\Delta C_{D_{trim}} = 0.00012 \times \left(\frac{\Delta f_{WIND-MILLING}}{S_w} + \frac{F_{N_{ASYMMETRIC}}}{q_{\infty} \times S_w} \right)^2$$

where:

$\Delta C_{D_{trim}}$ = lateral-directional trim increment due to an engine failure

$\Delta f_{WIND-MILLING}$
JET = parasite drag area due to a wind-milling engine

$F_{N_{ASYMMETRIC}}$ = net thrust of engine which is contributing asymmetric thrust for an engine failed condition

q_{∞} = freestream dynamic pressure $\left(\frac{1}{2} \rho V_{\infty}^2 \right)$

S_w = reference wing area

The basic aircraft configuration can be trimmed laterally, engine-out, with ailerons alone; i.e., without the use of spoilers. Therefore, the lateral-directional trim effects consist entirely of drag increments. The resulting lateral-directional trim drag increments were reduced to an equation form, shown in table A-3, and applied to the longitudinally trimmed engine-out aerodynamic data. Figures A-6 through A-15 show the longitudinally trimmed aerodynamic data for the turboprop aircraft.

A.1.3 Simple High-Lift System

The basic concept of the simplified high-lift system is the elimination of the leading-edge slat from the nominal high-lift system, which is described in section A.2.1.1.

Due to the simplified method which sufficed for evaluating the merits of the simple high-lift system, only the maximum lift coefficients were required for this system. These values are presented in table A-4 for both $1g$ and V_{min} stall conditions.

A.1.4 Advanced High-Lift System

The advanced flap aircraft incorporates a high-lift system that provides for large increments in lift at a fixed angle of attack, high lift-to-drag ratios especially at takeoff and climb-out flap settings, and high values of maximum lift coefficient. In order to achieve these requirements a track mounted flap with considerable aft extension with flap deflection is required. The following is a basic description of the high-lift system:

1. Trailing-edge flaps are track mounted, two-segment, double-slotted flaps employing considerable aft extension with flap deflection; see figure A-16.
2. The nested flap chord is 35% of the wing chord.
3. The trailing-edge flap is continuous spanwise from the fuselage to the aileron.

TABLE A-3

ENGINE-OUT LATERAL-DIRECTIONAL TRIM INCREMENTS-TURBOPROP AIRCRAFT

$$\Delta C_{D_{\text{engine-out}}} = (-0.0013 + 0.0001 \times \delta_F) \alpha + (0.12 + 0.001 \times \delta_F) \times T_C$$

where:

$\Delta C_{D_{\text{engine-out}}}$ = lateral-directional trim increment due to an engine failure

δ_F = flap angle, degrees

α = aircraft angle of attack, degrees

T_C = net thrust coefficient $\left(\frac{\text{aircraft net thrust}}{q_\infty S_w} \right)$



PREPARED BY: KDW MODEL: 7-17-74 REVISED: 7-17-74
REFERENCE: DATE PAGE NO. 7-17-74

TURBOPROP HIGH-LIFT, TWO ENGINE, NOMINAL FLAP, 0°

BOTH ENGINES OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, CG @ 25% C
 $V = 3.9$ ($\delta F = 0^\circ$)

Nominal Flap

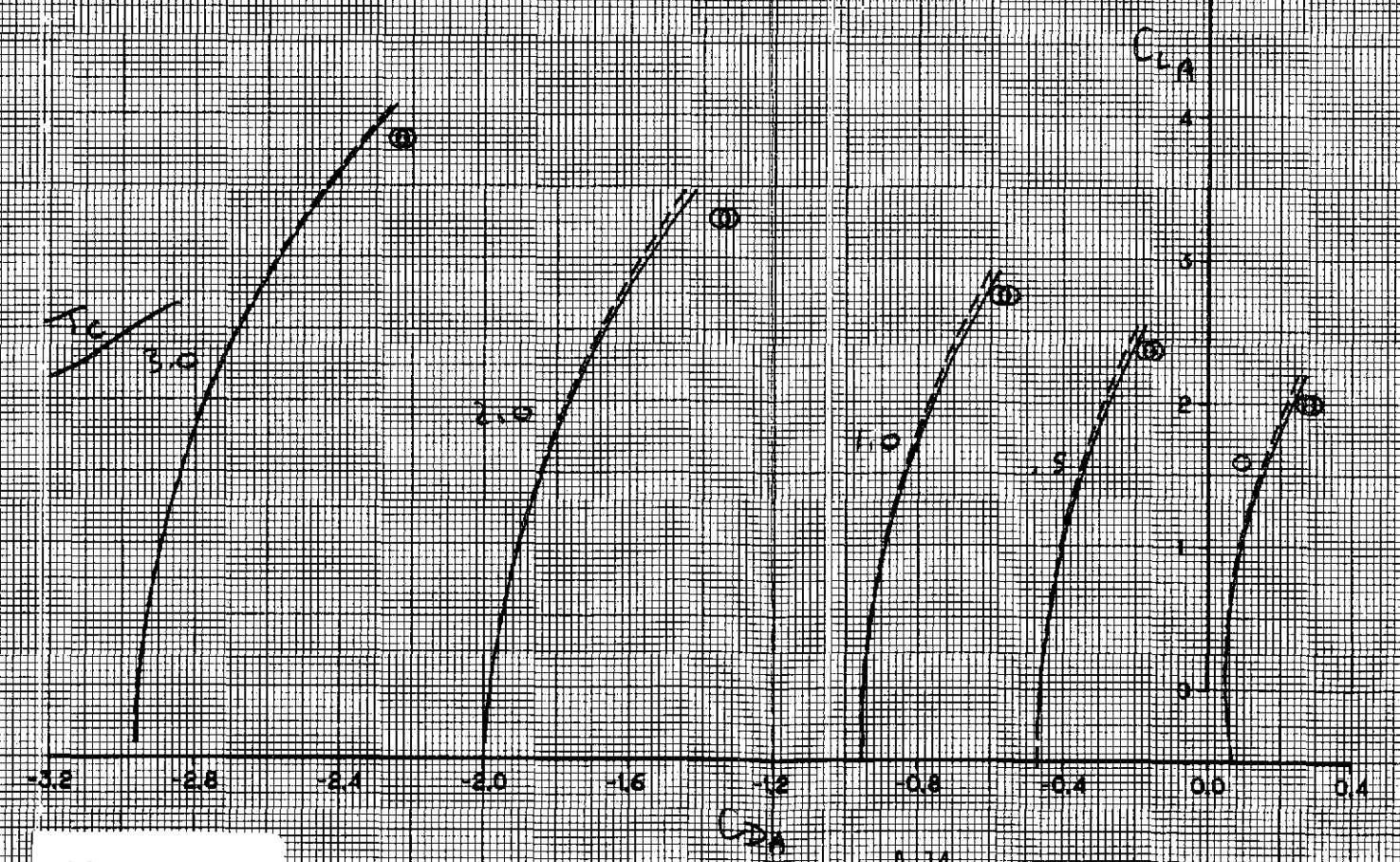
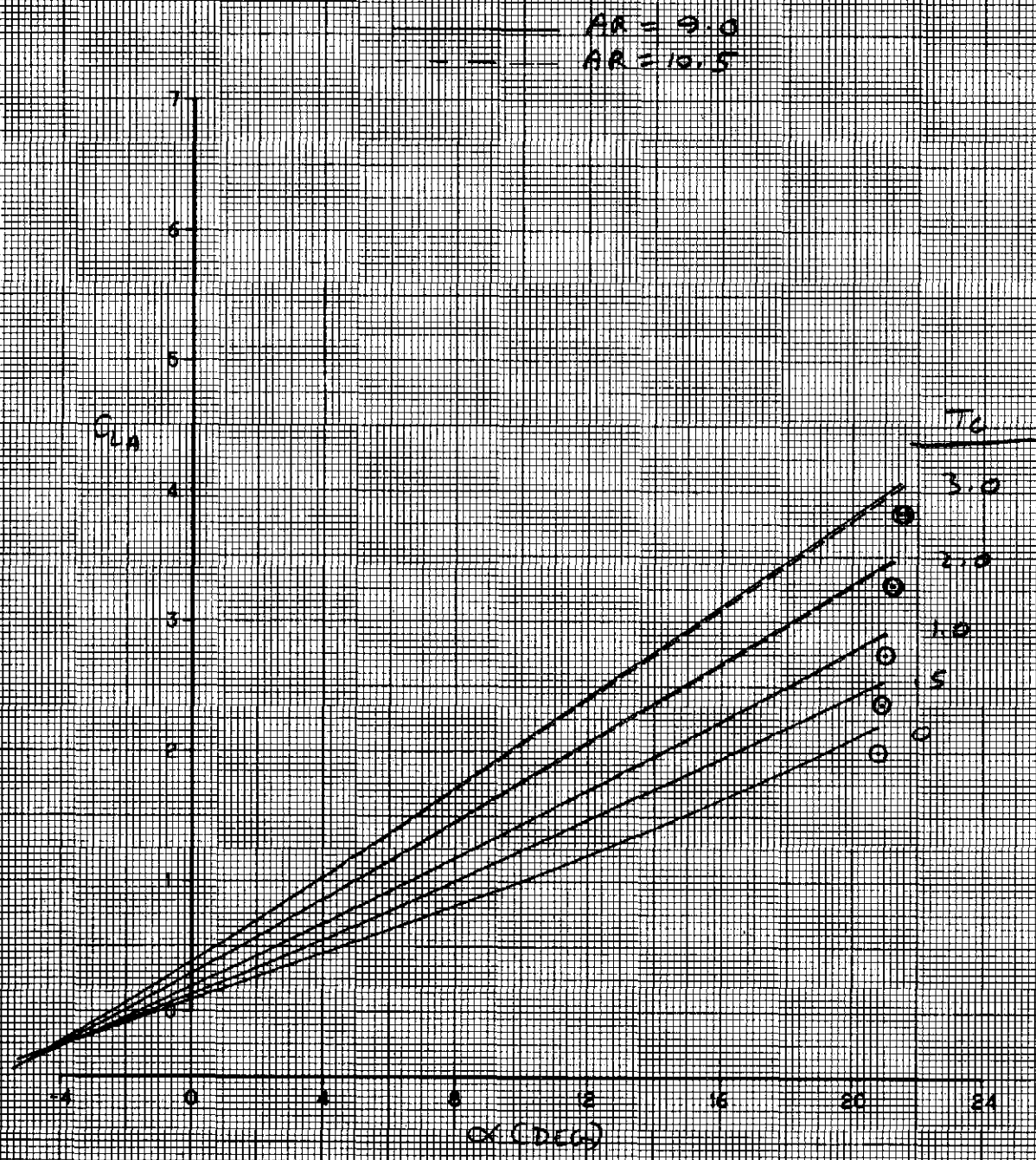


FIGURE A-6

A-14

COLDOUT FRAME

TURBOPROP HIGH-LIFT, TWO ENGINE, NOMINAL FLAP, 5°

BOTH ENGINES OPERATING
 FULL SPAN LEADING EDGE SLAT
 GEAR DOWN, $C_{g\delta} = 2.5\%$

$\alpha = 6^\circ$ ($\delta_F = 5^\circ$)

Nominal Flap

— AR = 9.0
 - - - AR = 10.5

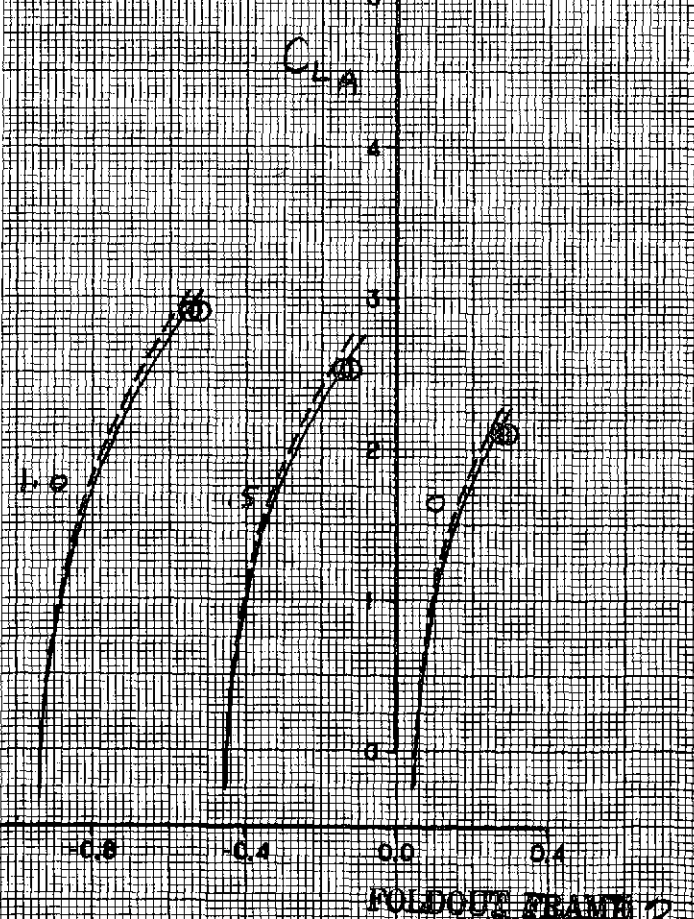
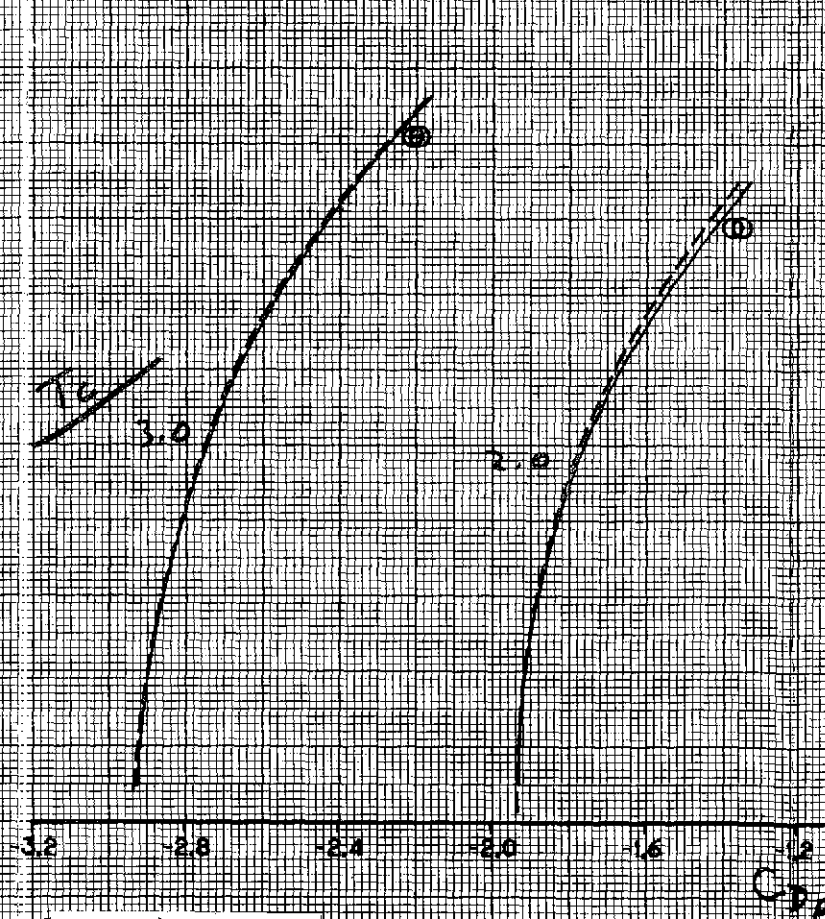
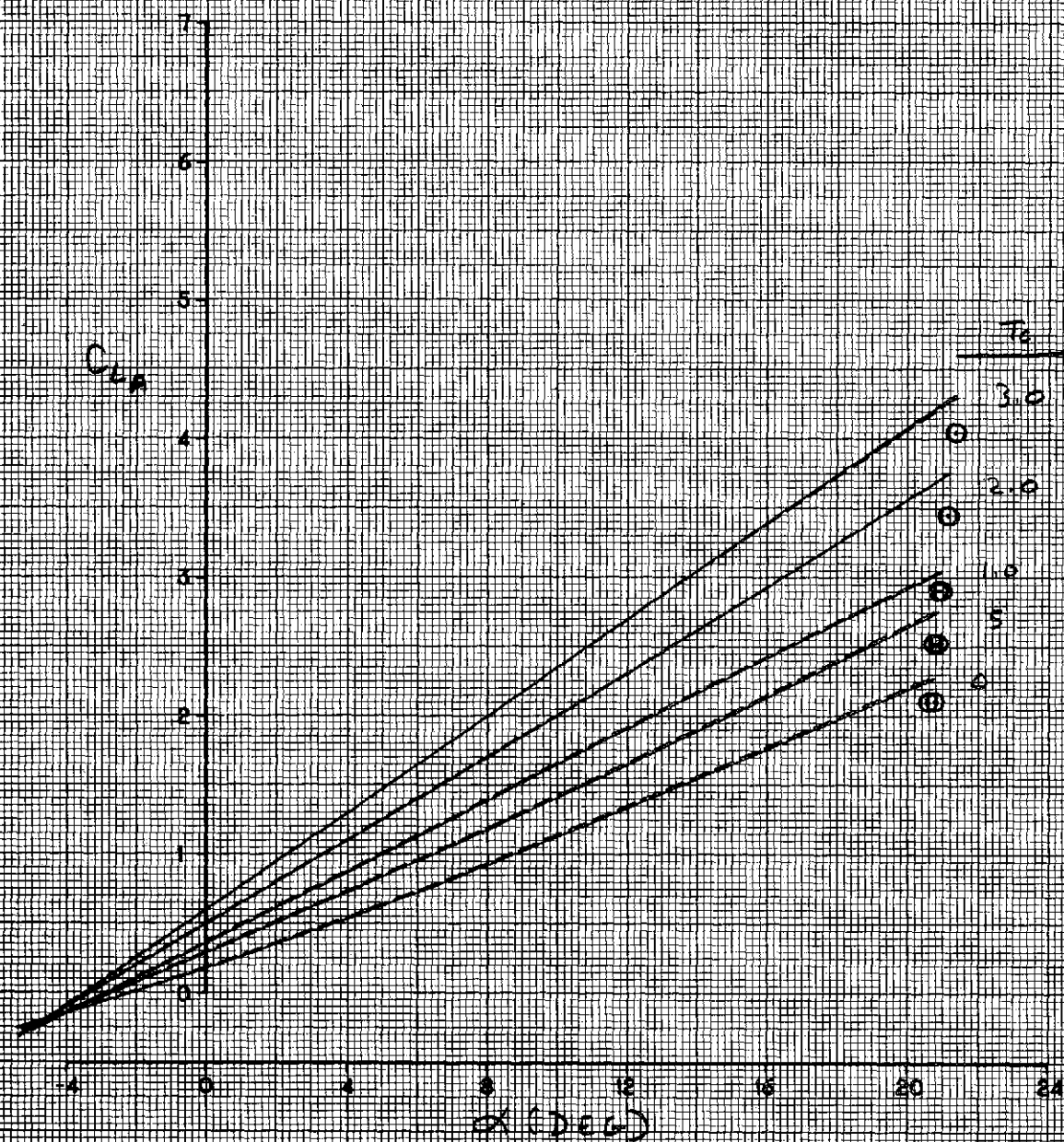


FIGURE A-7

A-15

FOLDOUT FRAME 2

TURBOPROP HIGH-LIFT, TWO ENGINE, NOMINAL FLAP, 15°
 BOTH ENGINES OPERATING
 FULL SPAN LEADING EDGE SLAT
 GEAR DOWN, C_g @ 25% C
 $2 \pm 10.4^\circ$ ($\delta_f = 15^\circ$)

Nominal Flap

AR = 9.0
 AR = 10.5

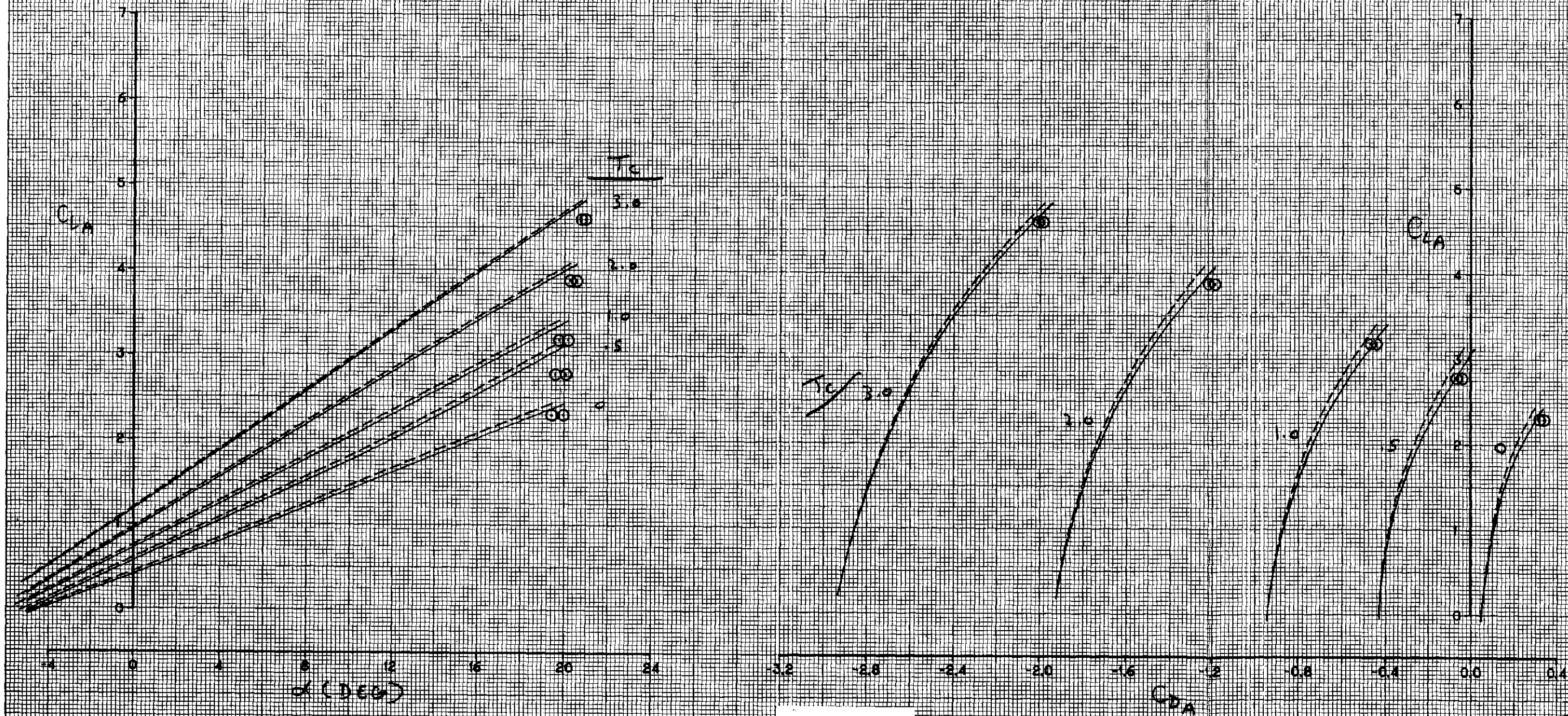


FIGURE A-8

A-16

FOLDOUT GRADE 2
 (15.8-V7A)



PREPARED BY: RDW REPORT NO. REVISED DATE: 7-17-74
REFERENCE PAGE NO.

TURBOPROP HIGH-LIFT, TWO ENGINE, NOMINAL FLAP, 25°
BOTH ENGINES OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, CG @ 25% C
 $V = 14.2^\circ$ ($\delta_F = 25^\circ$)
Nominal Flap

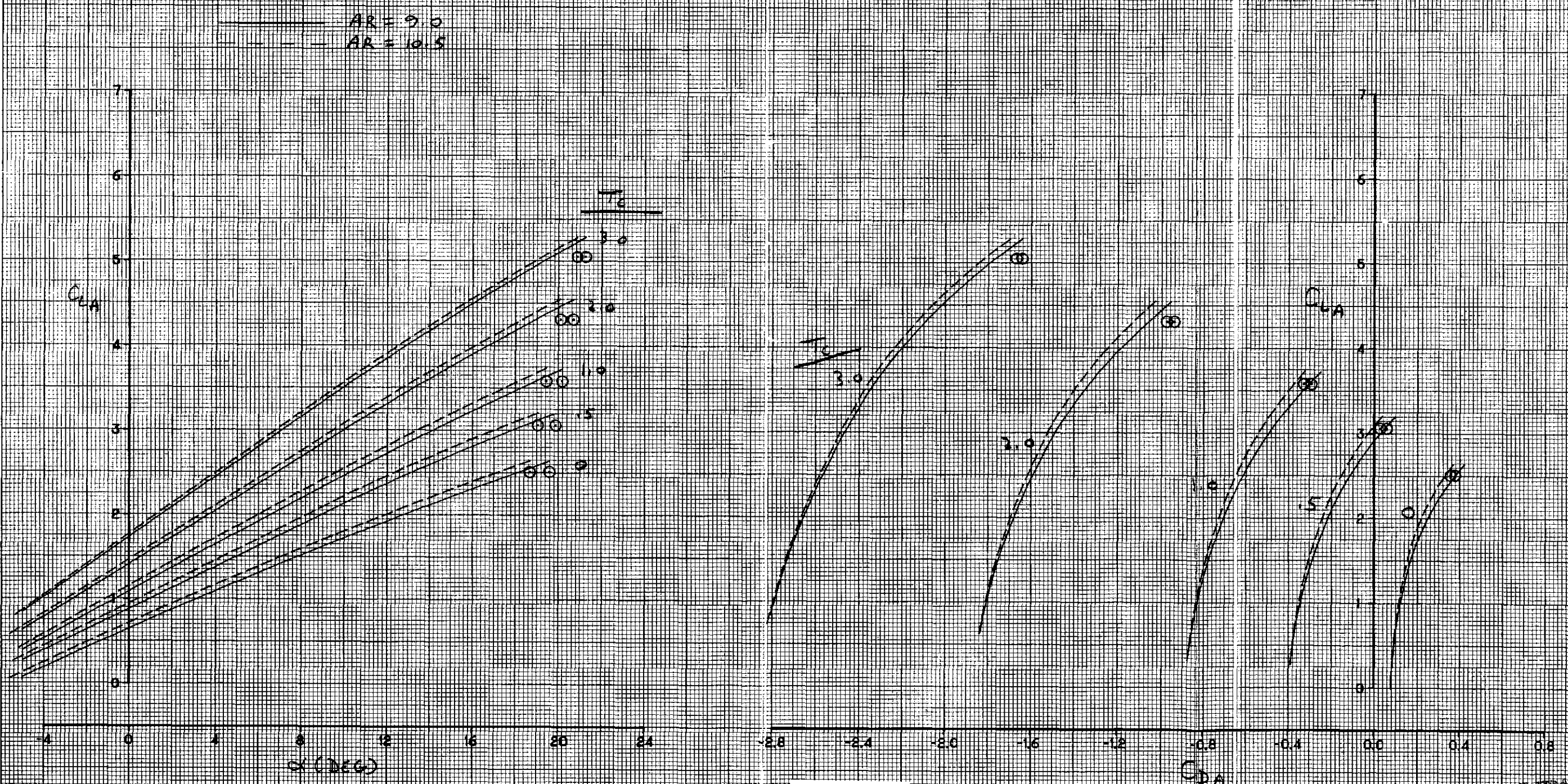


FIGURE A-9

T FRAME

OLDOUT FRAME 2

(15-8 .V38)

7-17-79

REVISED

REPORT NO.

MODEL

RDW

PREPARED BY:

REFERENCE

DATE

PAGE NO.

TURBOPROP HIGH-LIFT, TWO ENGINE, NOMINAL FLAP, 50°

BOTH ENGINES OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, C.G. @ 25% \bar{c}

$\alpha = 27^\circ$ ($\delta_f = 50^\circ$)

Nominal Flap

AR = 9.0
AR = 10.5

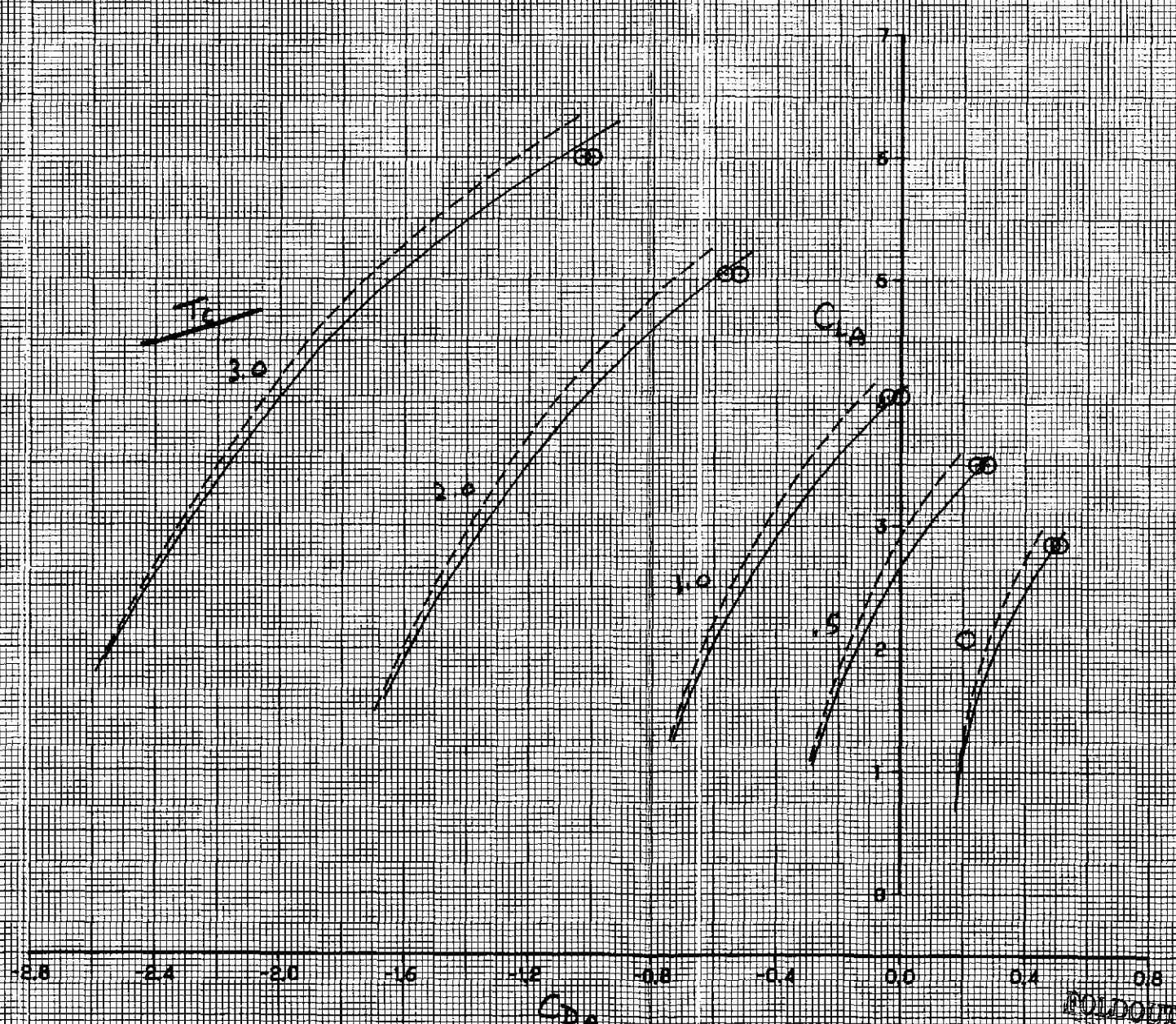
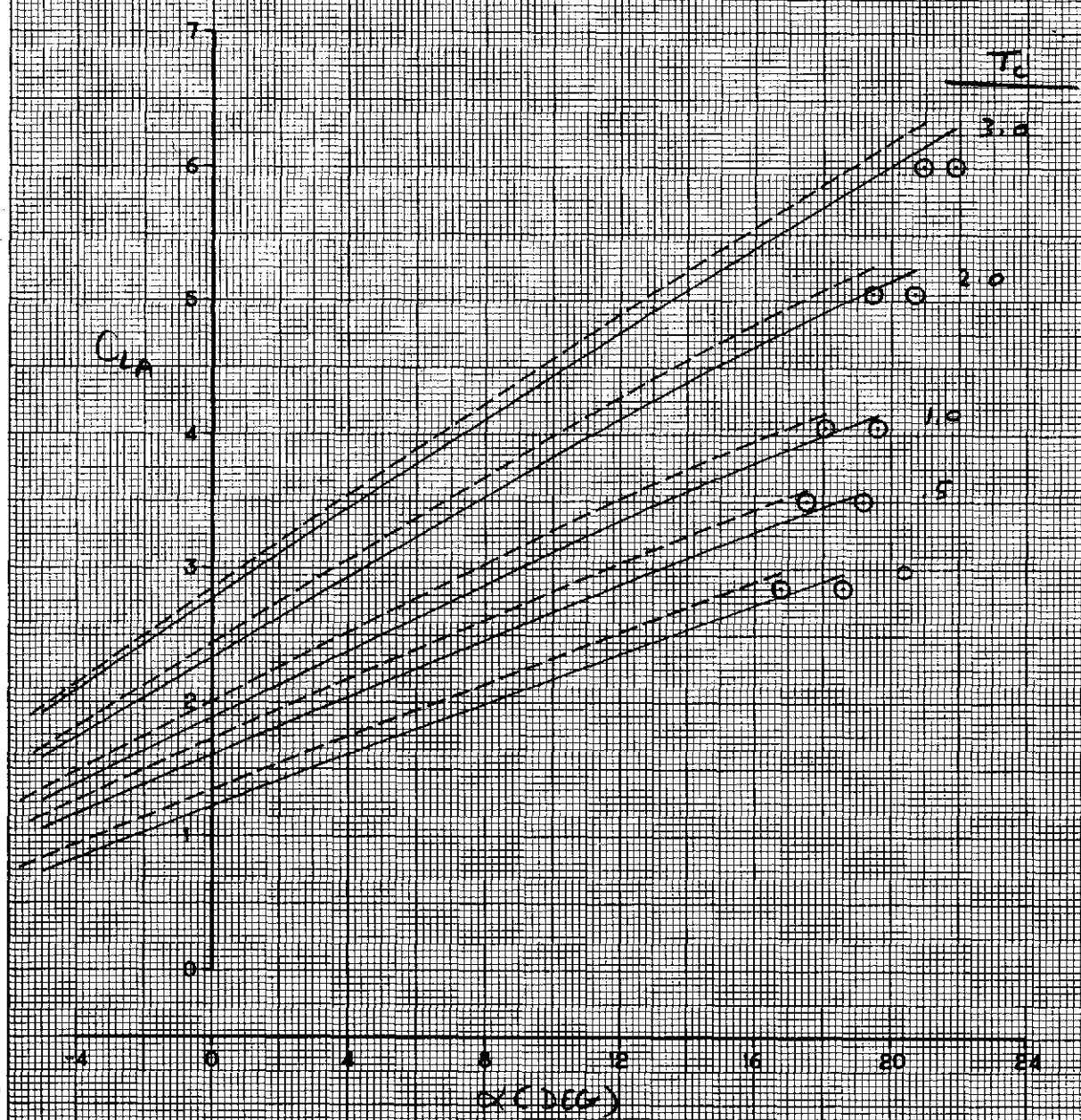


FIGURE A-10

A-18

FOLDOUT FRAME

FOLDOUT FRAME 2



TURBOPROP HIGH-LIFT ONE ENGINE, NOMINAL FLAP, 0°

ONE ENGINE OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, C.G. @ 25% MAC

$\gamma = 3.9^\circ$ ($\delta_F = 0^\circ$)

LATERAL DIRECTIONAL TRIM
ADDED SEPARATELY

Nominal Flap

AR = 9.0
AR = 10.5

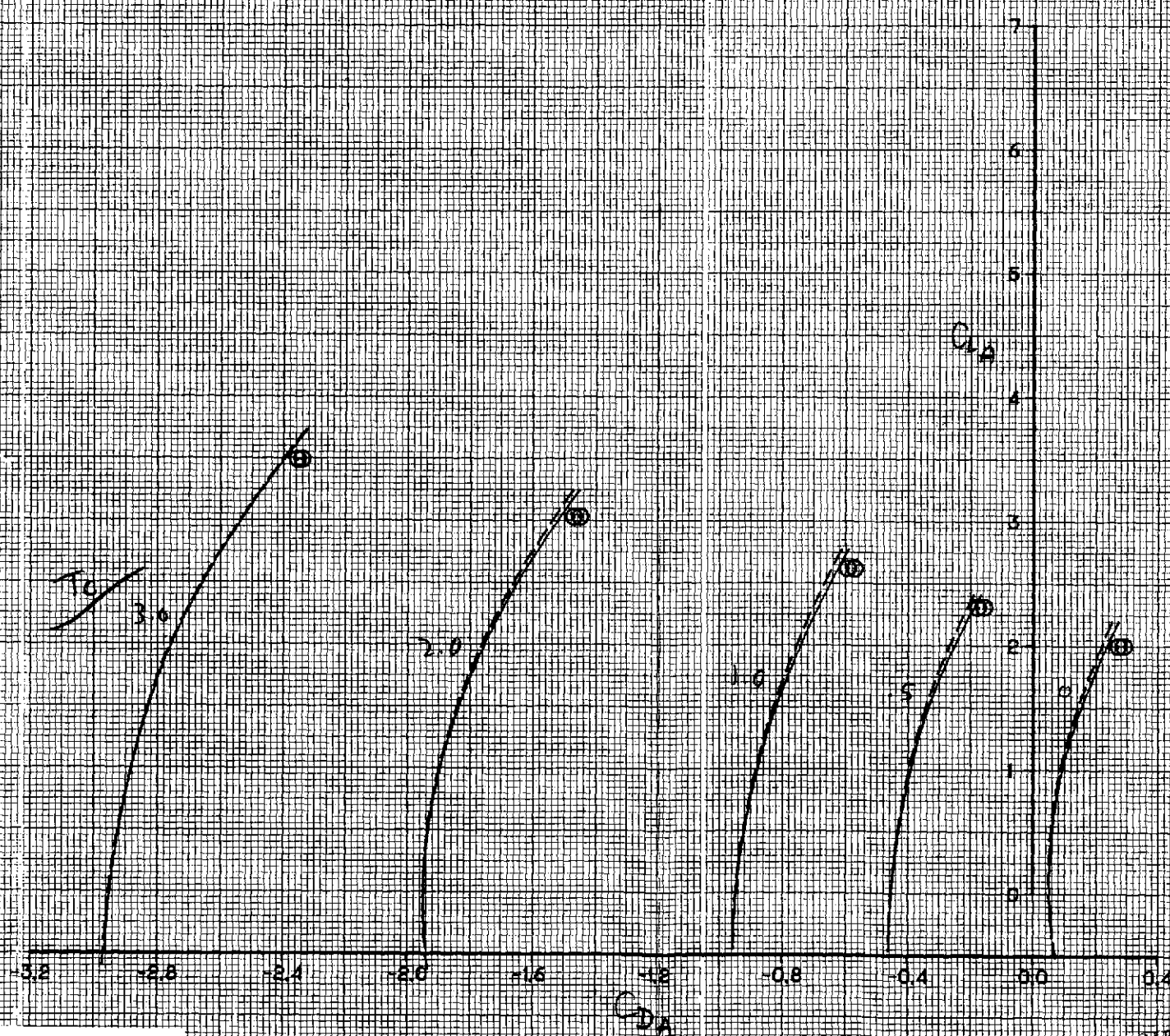
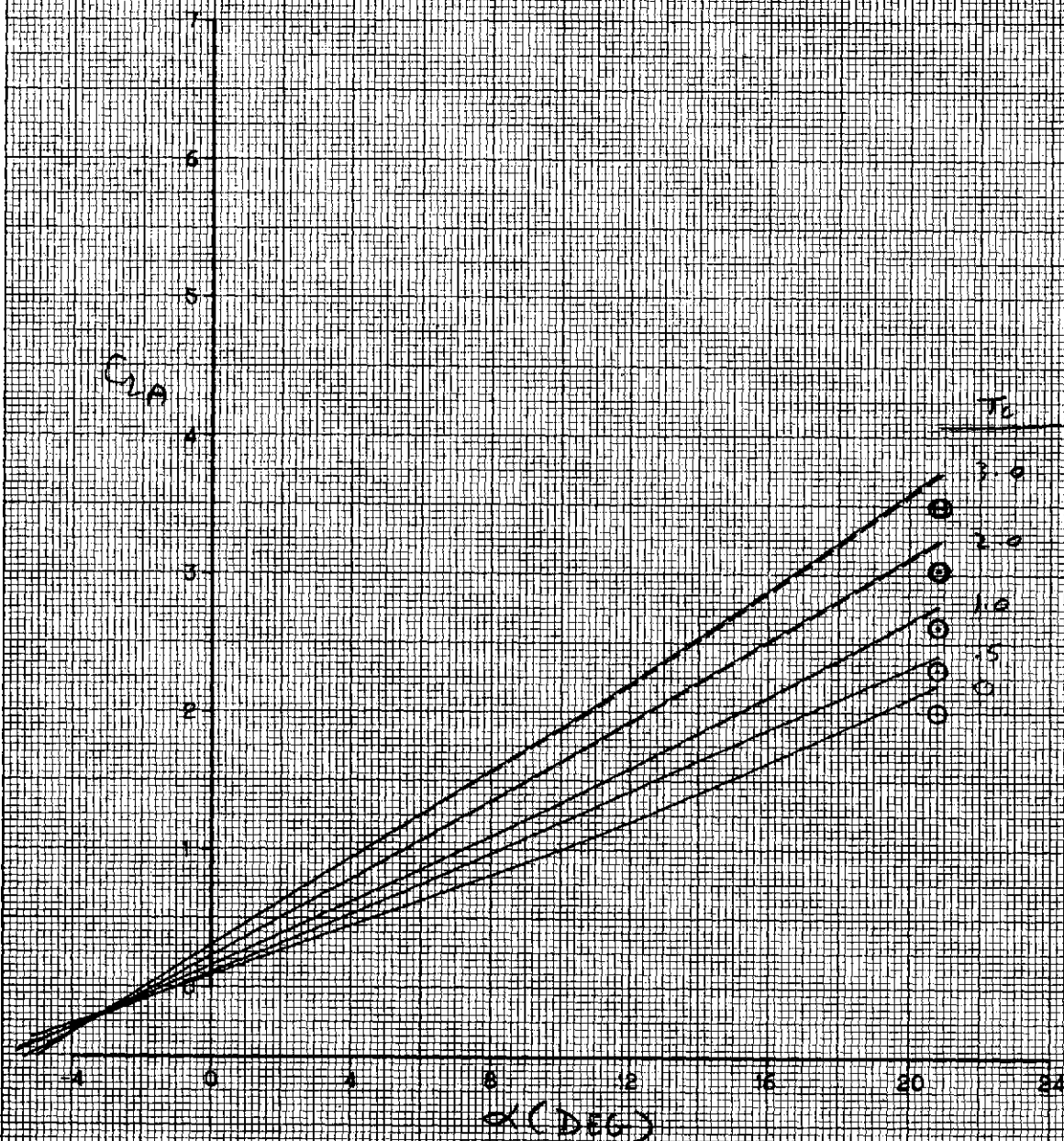


FIGURE A-11

A-19

FOLDOUT FRAME

FOLDOUT FRAME



PREPARED BY: RDW MODEL: _____ REPORT NO.: _____ REVISED: _____
REFERENCE: _____ PAGE NO.: _____ DATE: 7-17-79

TURBOPROP HIGH-LIFT, ONE ENGINE, NOMINAL FLAP, 5°
ONE ENGINE OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, CG @ 25% \bar{c}
 $\eta = 6^\circ$ ($\delta\alpha = 5^\circ$)
LATERAL DIRECTIONAL TRIM
ADDED SEPARATELY
Nominal Flap

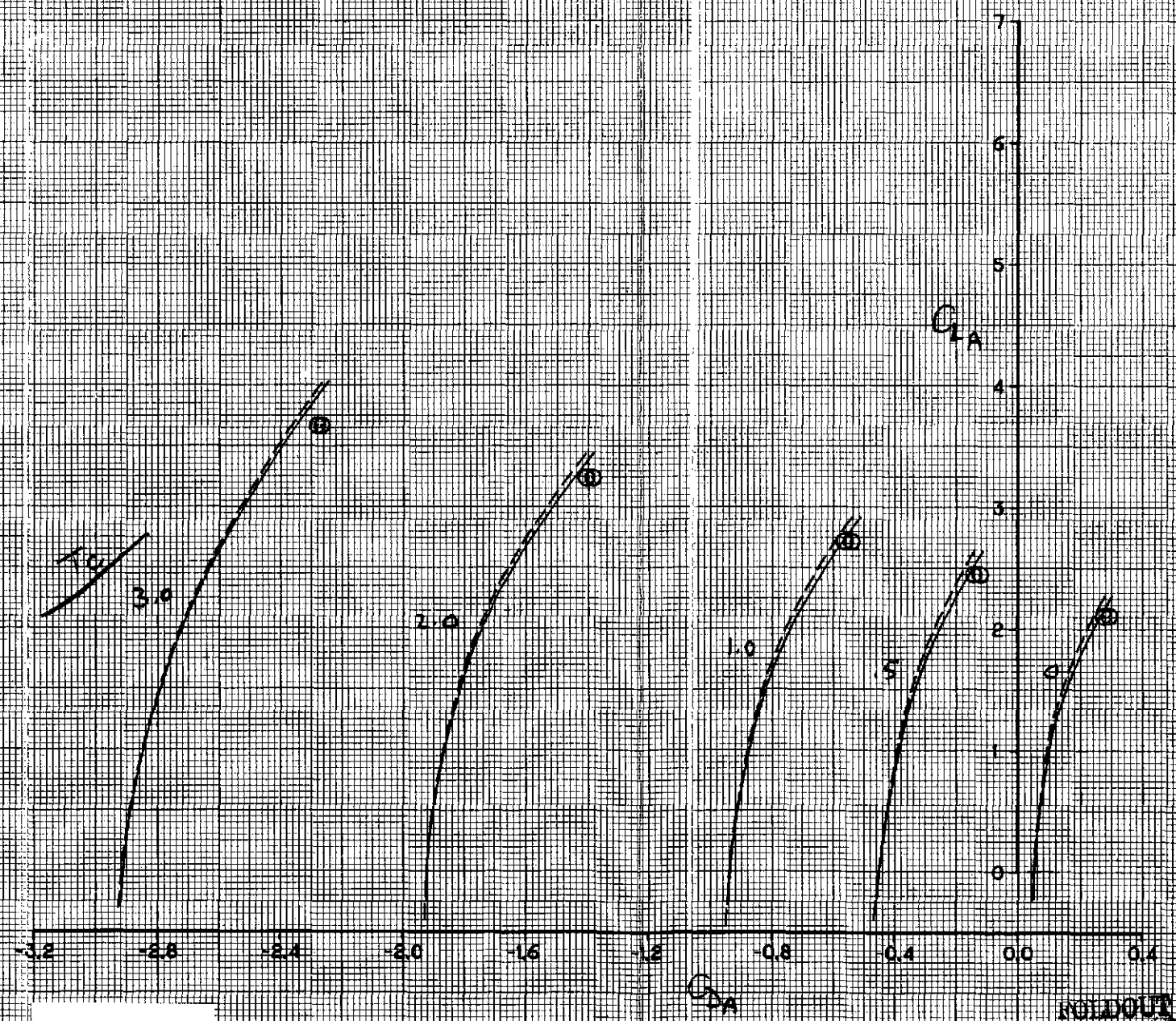
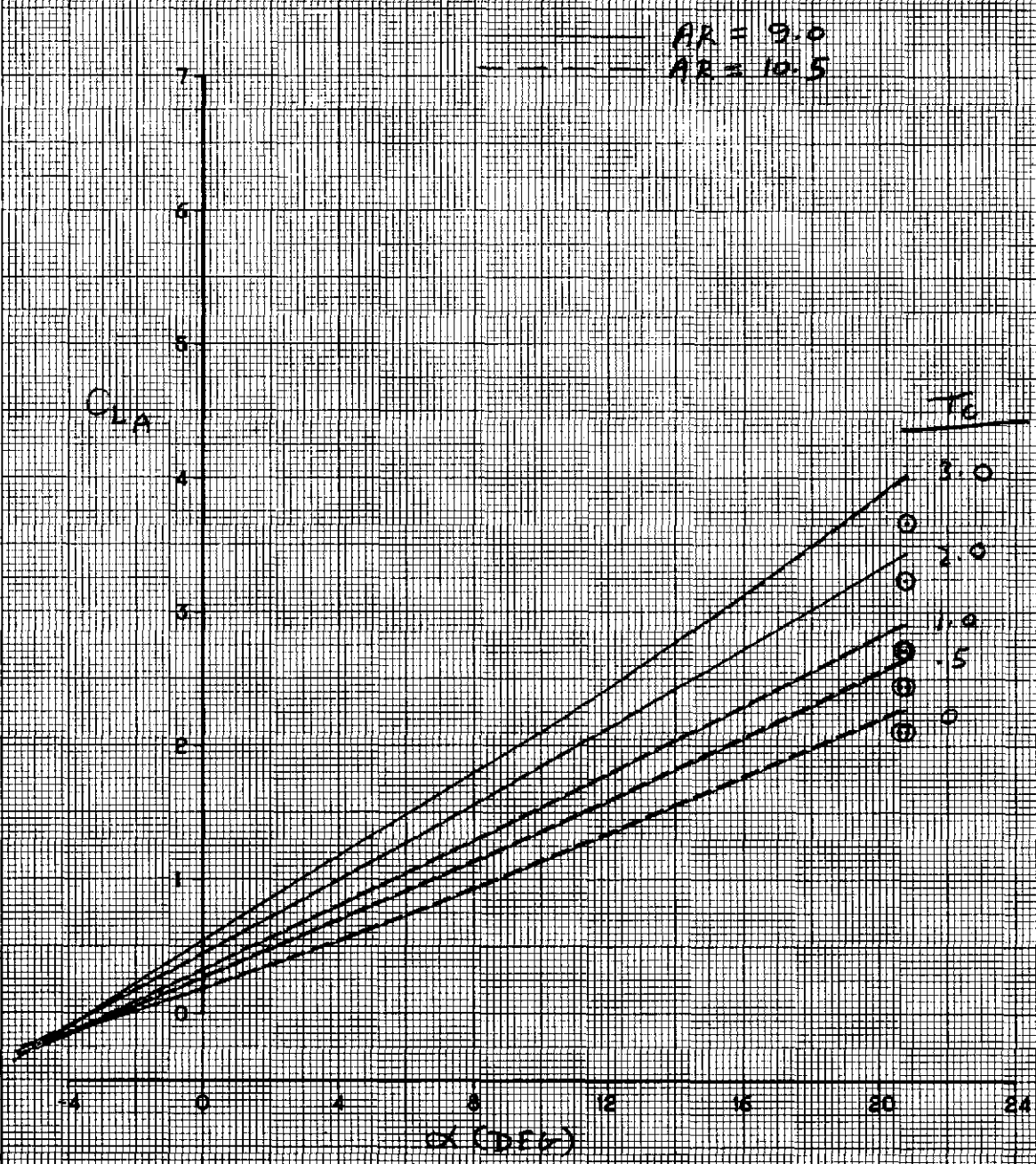


FIGURE A-12

A-20

FOLDOUT FRAME

FOLDOUT FRAME

TURBOPROP HIGH-LIFT, ONE ENGINE, NOMINAL FLAP, 15°

ONE ENGINE OPERATING
 FULL SPAN LEADING EDGE SLAT
 GEAR DOWN, 19 @ 25% Z

$V = 10.4^\circ$ ($\delta_F = 15^\circ$)

LATERAL DIRECTIONAL TRIM
 ADDED SEPERATELY

Nominal Flap

AR = 9.0
 AR = 10.5

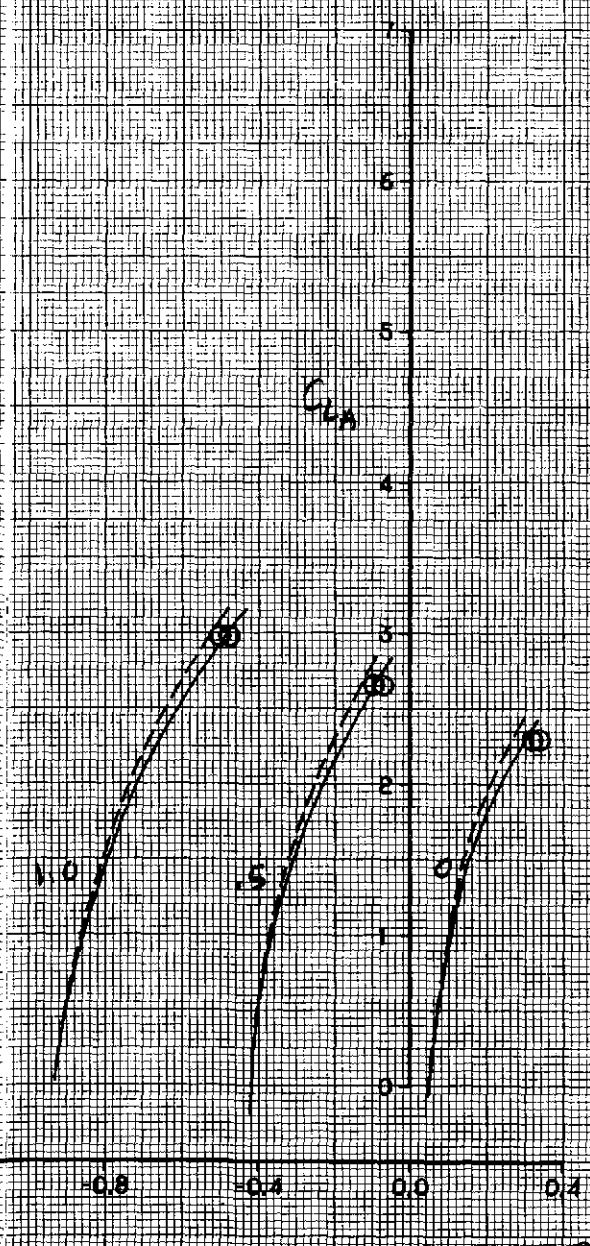
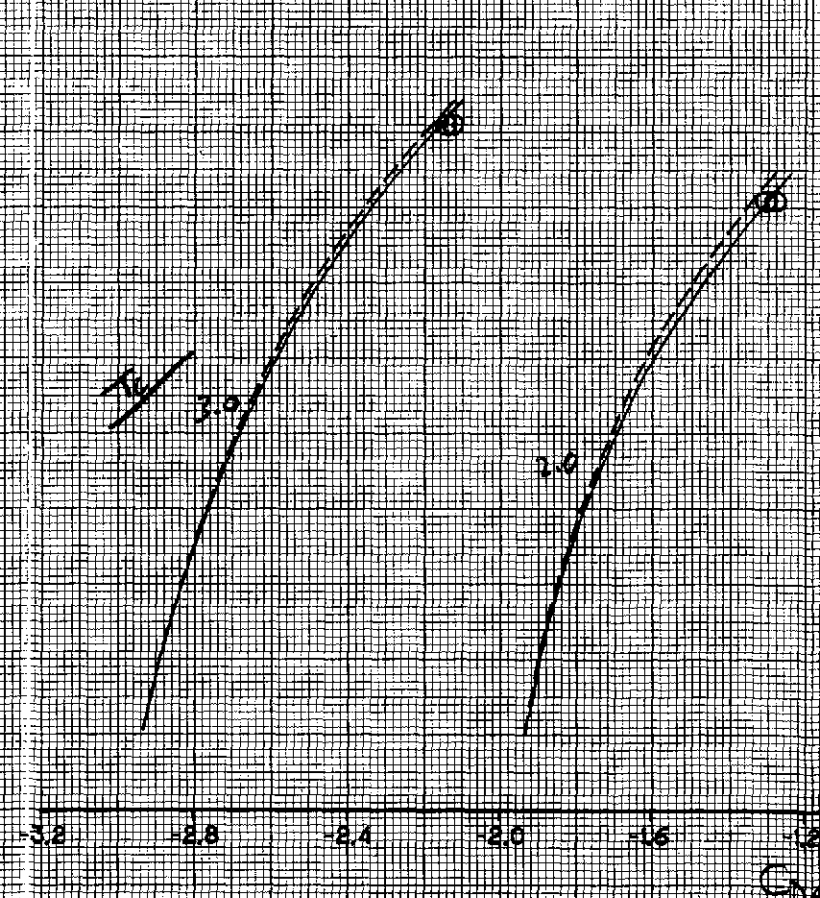
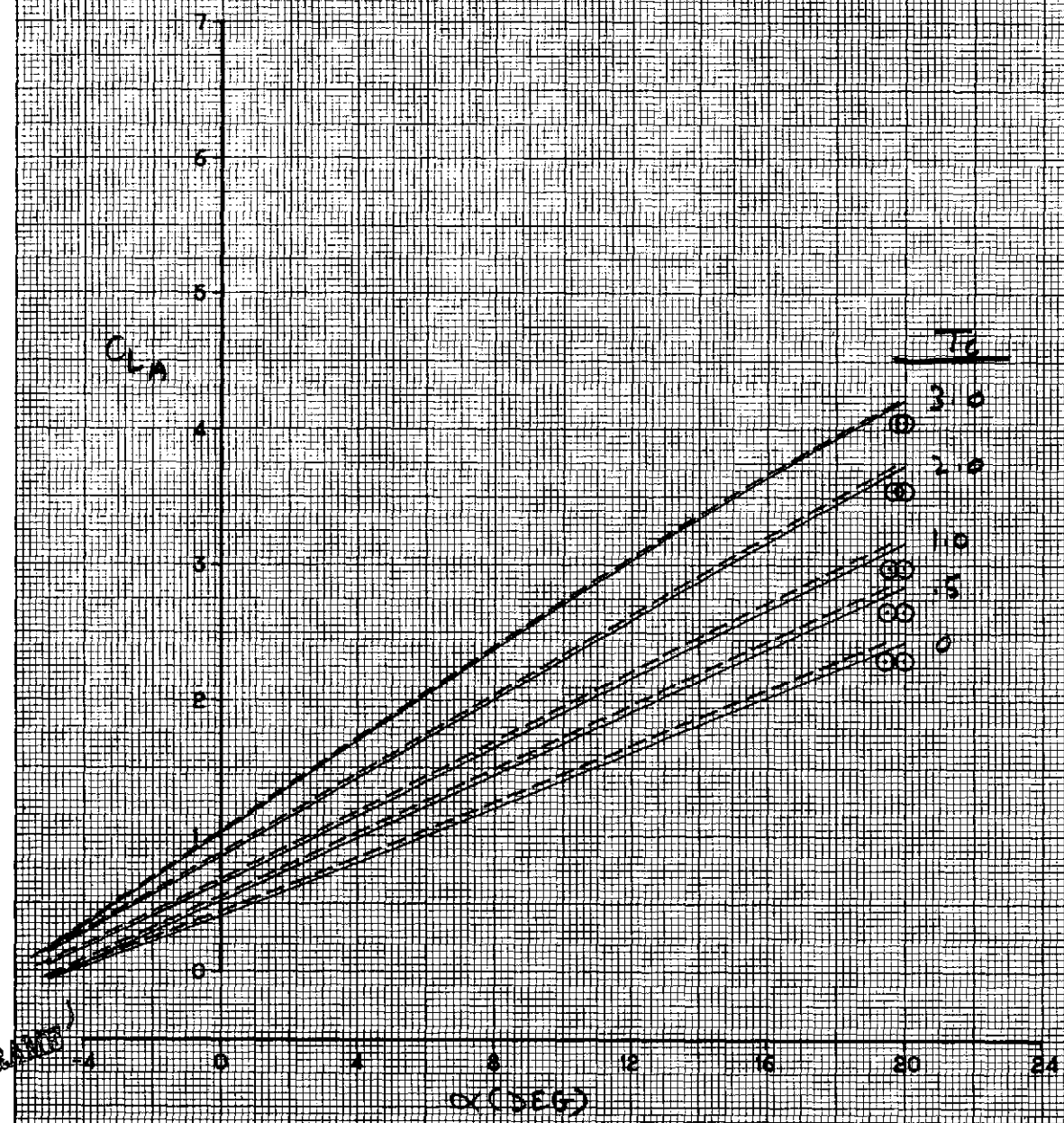


FIGURE A-13

FOLDOUT FRAME

FOLDOUT FRAME



PREPARED BY: RDN REVISED: REPORT NO. MODEL: DATE: 7-17-79 PAGE NO. REFERENCE

TURBOPROP HIGH LIFT, ONE ENGINE, NOMINAL FLAP, 25°
ONE ENGINE OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, CG @ 25% C

$\alpha = 14.2^\circ$ ($\delta_f = 25^\circ$)

LATERAL DIRECTION TRIM
ADDED SEPERATELY

Nominal Flap

— AR = 9.0
--- AR = 10.5

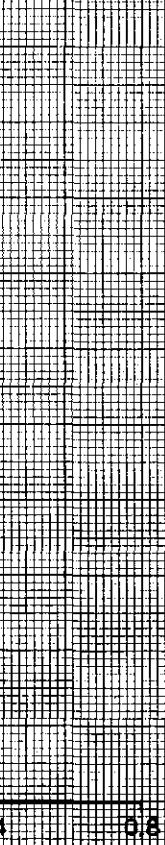
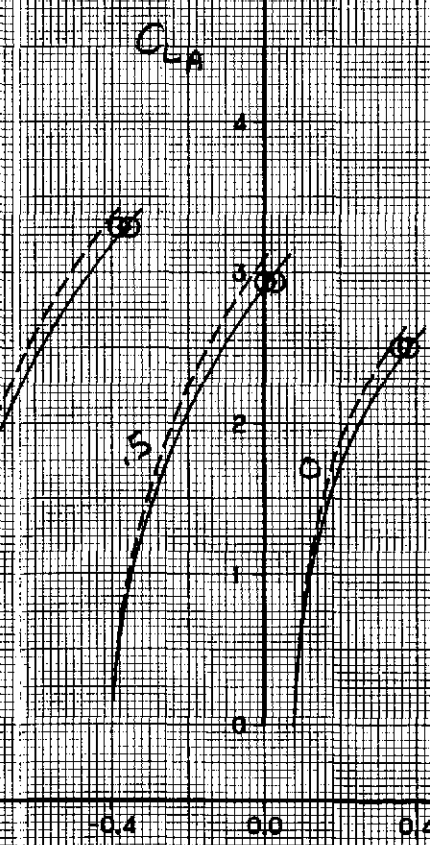
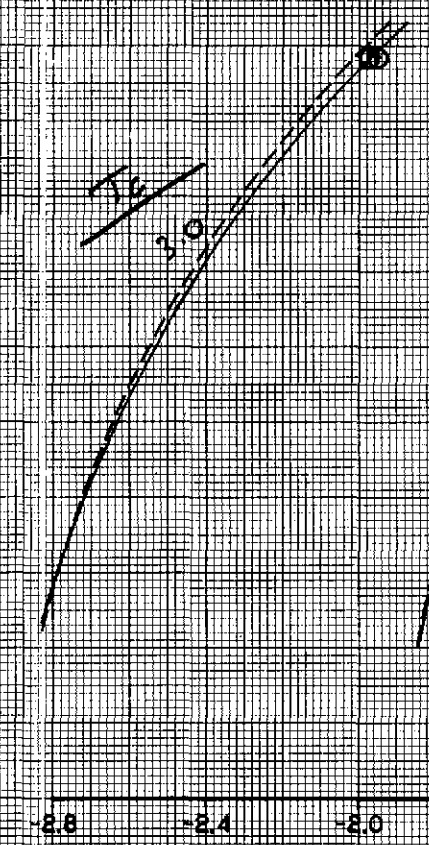
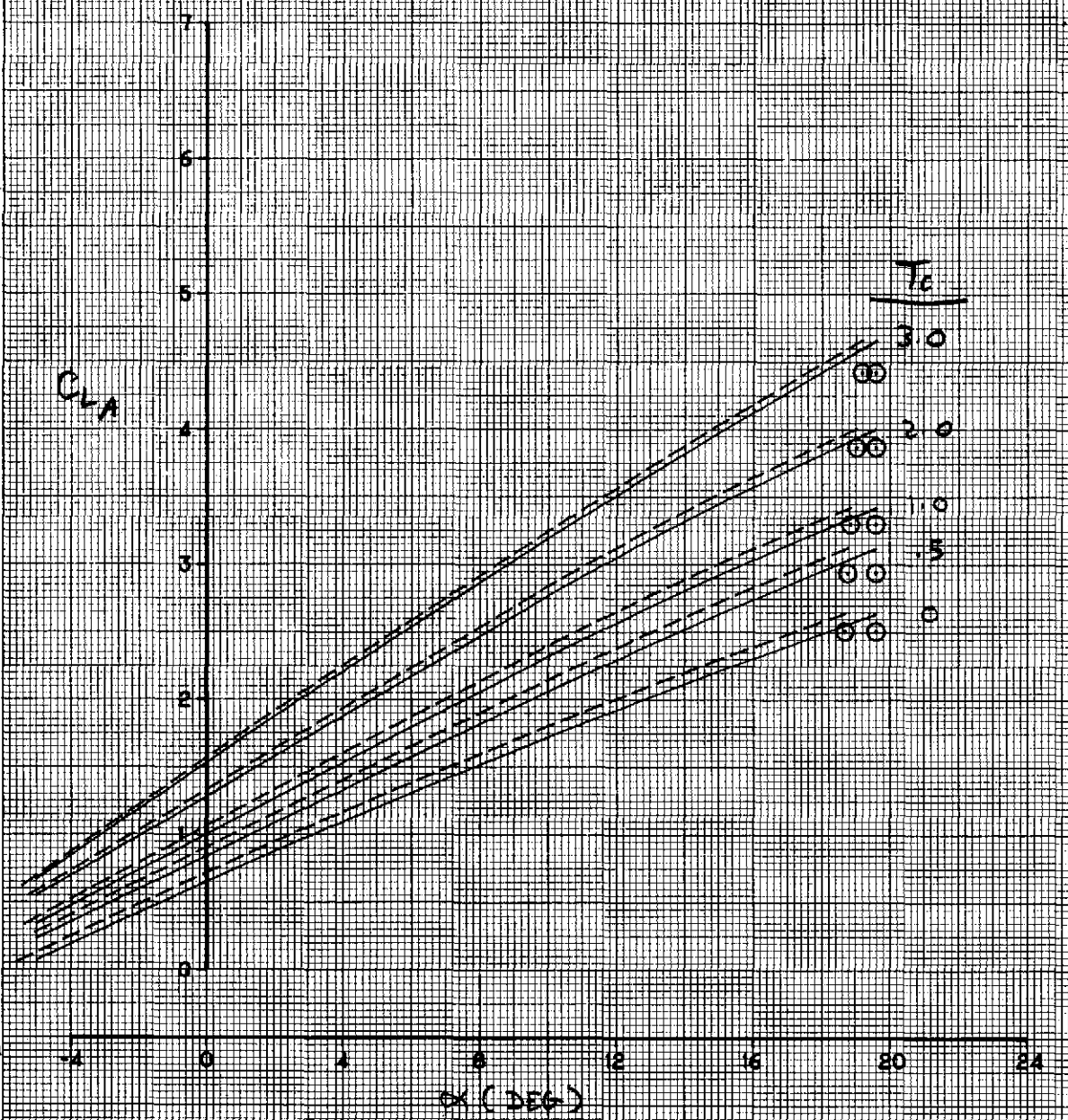


FIGURE A-14

A-22

FOLDOUT FRAME

FOLDOUT FRAME
(15-0.538)



TURBOPROP HIGH LIFT, ONE ENGINE, NOMINAL FLAP, 50°

ONE ENGINE OPERATING
FULL SPAN LEADING EDGE SLAT
GEAR DOWN, $C_D = 0.25$

$\alpha = 22^\circ$ ($\delta_f = 50^\circ$)

LATERAL-DIRECTIONAL TRIM
ADDED SEPARATELY

Nominal Flap

AR = 9.0
AR = 10.5

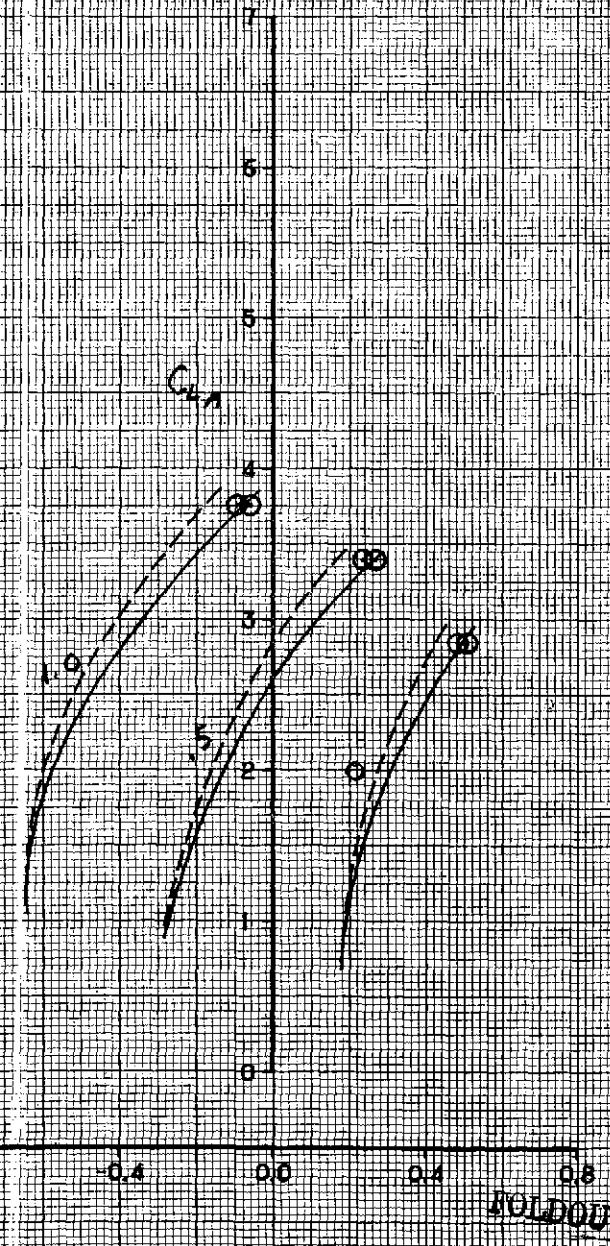
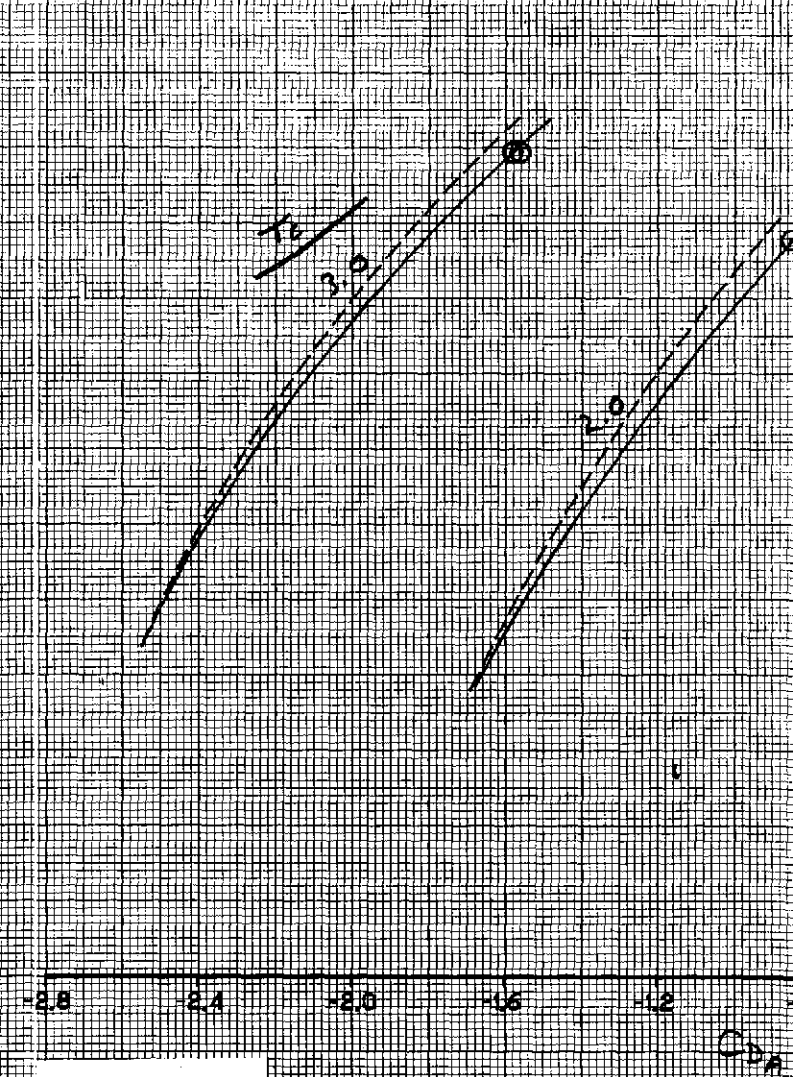
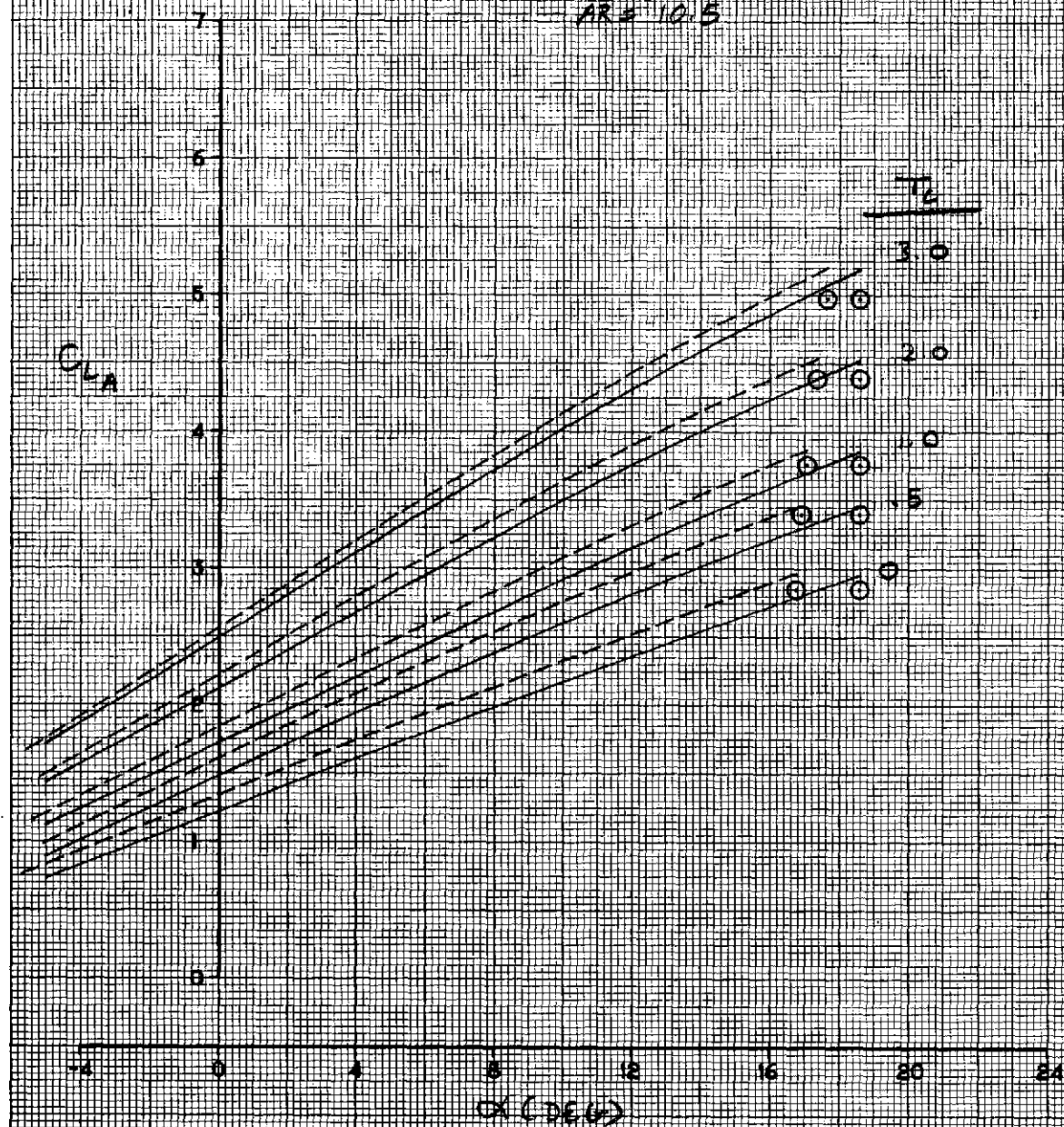


FIGURE A-15

FOLDOUT FRAME 2

TABLE A-4
SIMPLE HIGH LIFT SYSTEM, MAXIMUM LIFT COEFFICIENTS

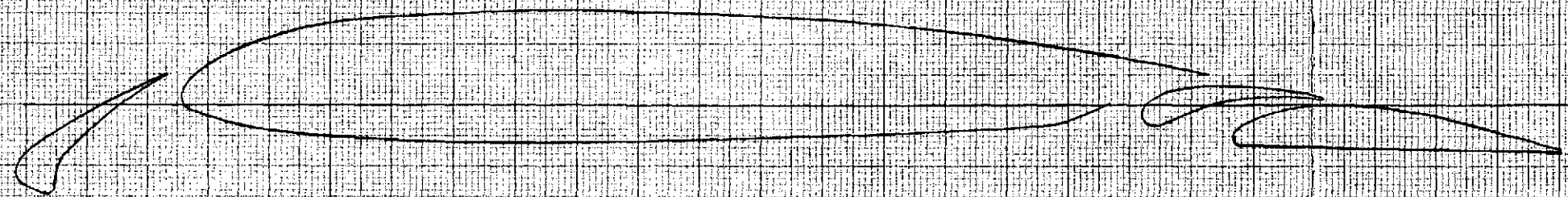
<u>FLAP ANGLE (degrees/radians)</u>	<u>$C_{LM_{1g}}$</u>	<u>$C_{LM_{Vmin}}$</u>
0/0	1.35	1.42
5/0.087	1.46	1.59
15/0.262	1.64	1.79
25/0.436	1.82	1.93
50/0.873	2.15	2.28

ADVANCED HIGH LIFT SYSTEM

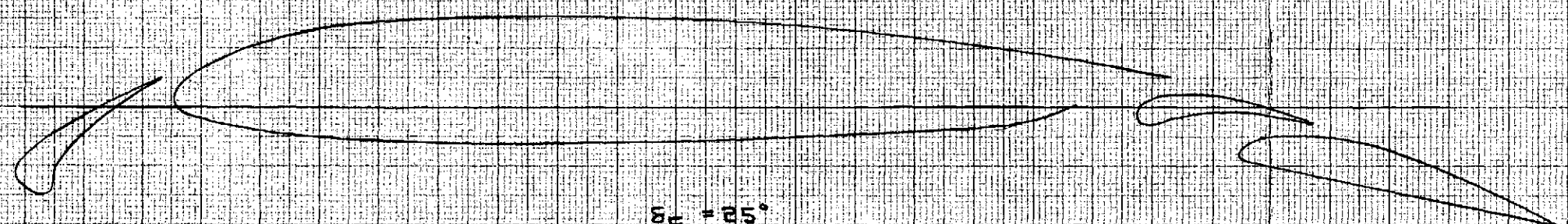
SUPER CRITICAL WING NOT REPRESENTED

$(C_F/C)_{NESTED} \approx .35$

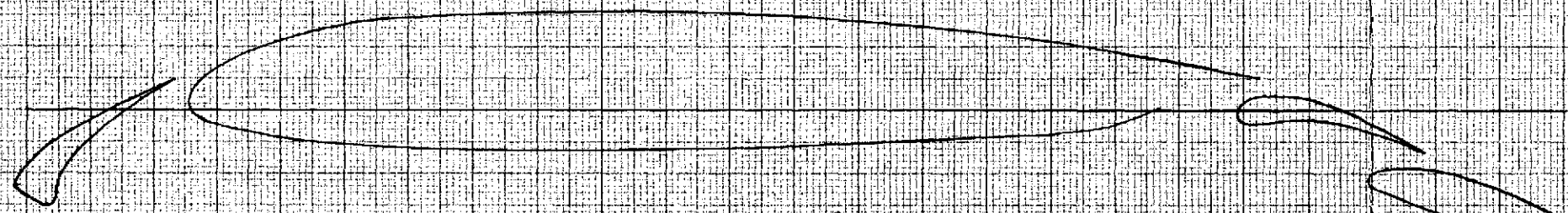
$\delta_F = 5^\circ$



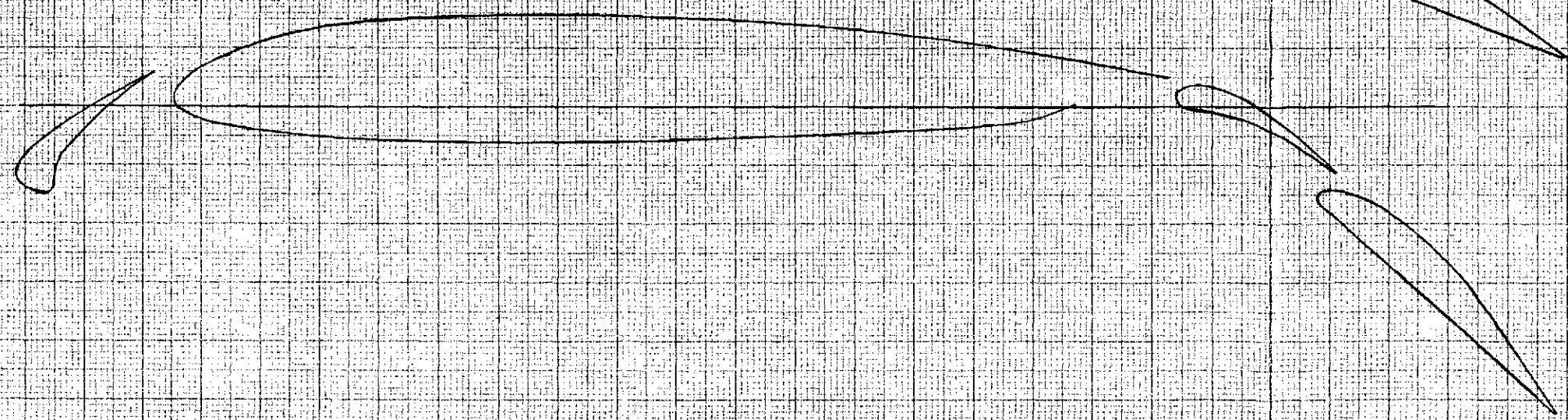
$\delta_F = 15^\circ$



$\delta_F = 25^\circ$



$\delta_F = 45^\circ$



0 10 20 30 40 50 60 70 80 90 100
PERCENT WING CHORD

FOLDOUT FRAME

FOLDOUT FRAME

FIGURE A-16

A-25

12158.1C. 114

4. A 15% chord full-span leading-edge slat is provided to prevent flow separation at high angles of attack.

The low-speed aerodynamic characteristics used for the advanced flap high-lift systems are similar to that described above. The effects of Reynolds number on maximum lift coefficient were based on comparisons of low Reynolds number wind tunnel test data and flight test data for the basic DC-9 configurations. Douglas-developed analytical and empirical methods were used to adjust the DC-9 based data to the lower 5 degrees (0.087 rad) quarter chord sweep.

Figure A-17 shows the estimated out-of-ground effect longitudinally trimmed lift and drag characteristics for the advanced flap aircraft. The maximum lift coefficients for determining l_g and V_{min} stall speeds are presented in table A-5. The estimated engine-out lateral-directional trim increments used in the performance analysis are based on the methods as used for the nominal high-lift system.

A.2.1.5 Ground Effects

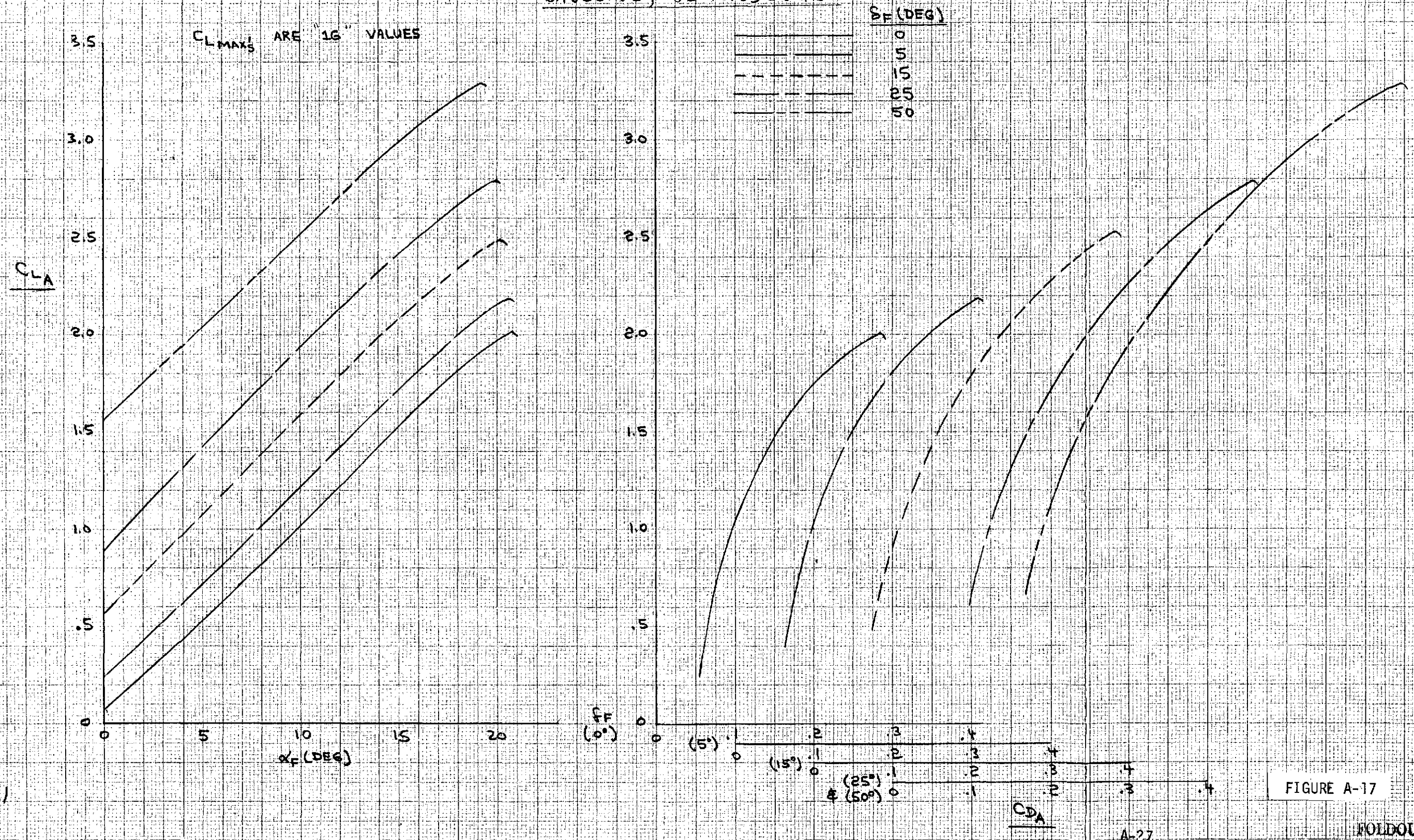
Empirical methods based on DC-9 wind tunnel and flight test data were used to estimate lift and drag increments due to ground effect as aircraft height changed. The empirical curves of the type used are presented in figures A-18 and A-19. Figures A-20 and A-21 present the in-ground-effect high-lift data for the advanced and nominal high-lift systems with main gear on the ground.

A.2.2 High-Speed Aerodynamic Characteristics

The cruise drag characteristics for the configurations have been estimated by the well-established Douglas drag prediction procedure for transport aircraft. The cruise drag consists of zero-lift parasite drag and the drag due to lift at Mach numbers below those at which compressibility effects exist, plus the drag due to compressibility. The zero-lift parasite drag and the drag due to lift are evaluated at 0.5 Mach number, but at the Reynolds number corresponding to the

ADVANCED FLAP

TRIMMED LIFT AND DRAG CHARACTERISTICS
FULL SPAN LEADING EDGE SLAT
ADJUSTED TO FLT. REYNOLDS NO.
GEAR DOWN, C.G. = .25 MAC
BASELINE, 50 PASSENGER



CLA

SA (DEG)

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Co. J. F.

(5)

(15)

(2)

09

CA

FIGURE A-17

A-27

FOLDOUT FRAME

FOLDOUT FRAME

TABLE A-5
ADVANCED HIGH LIFT SYSTEM, MAXIMUM LIFT COEFFICIENTS

<u>FLAP ANGLE (degrees/radians)</u>	<u>$C_{L_{M_{1g}}}$</u>	<u>$C_{L_{M_{Vmin}}}$</u>
0/0	2.01	2.08
5/0.087	2.19	2.32
15/0.262	2.49	2.64
25/0.436	2.79	2.90
50/0.873	3.29	3.42



HEIGHT CORRELATION FACTOR FOR LIFT IN GROUND EFFECT

$$C_{L \text{ Ground Effect}} = C_L + K_L (C_{L \text{ Gear On Ground}} - C_L)$$

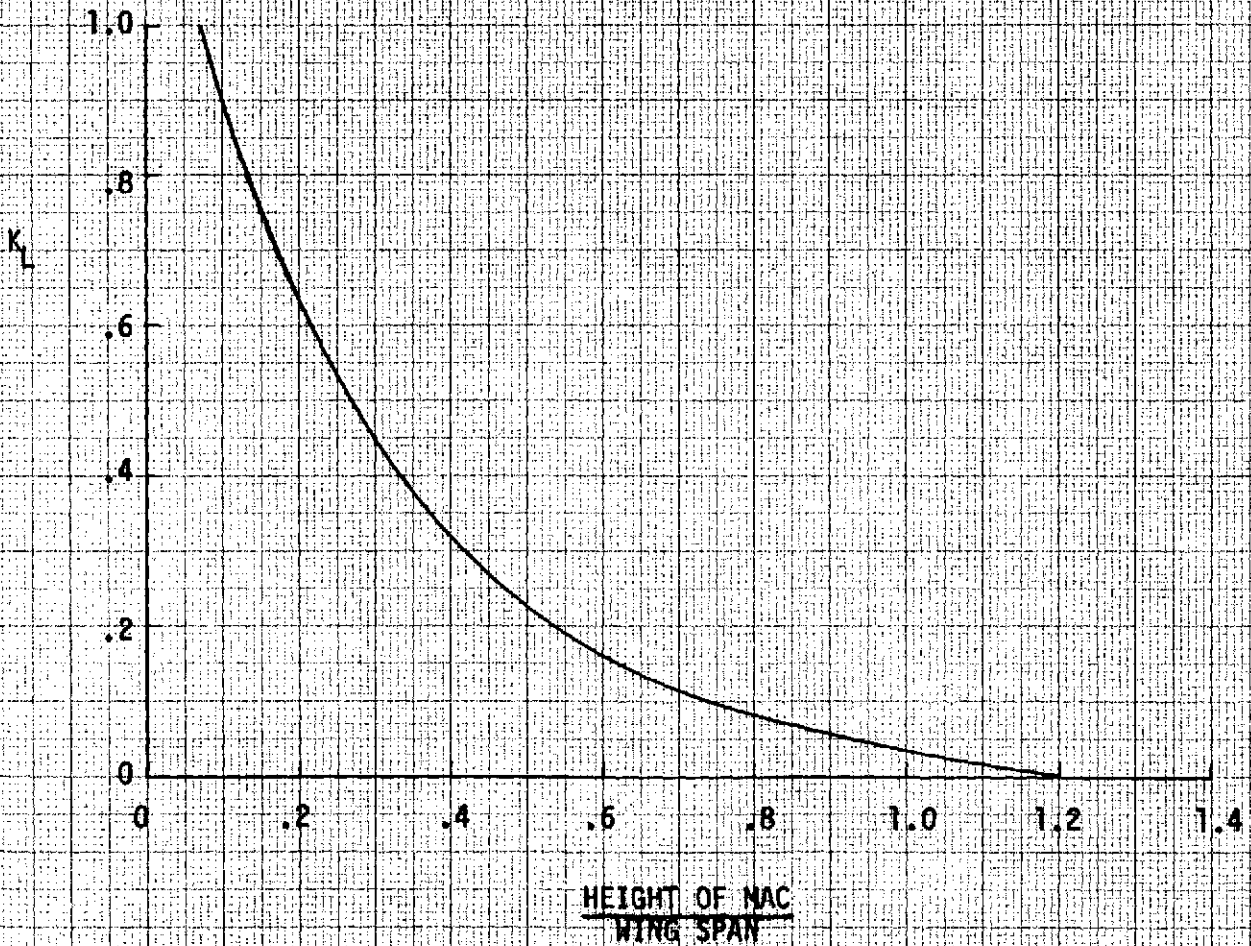


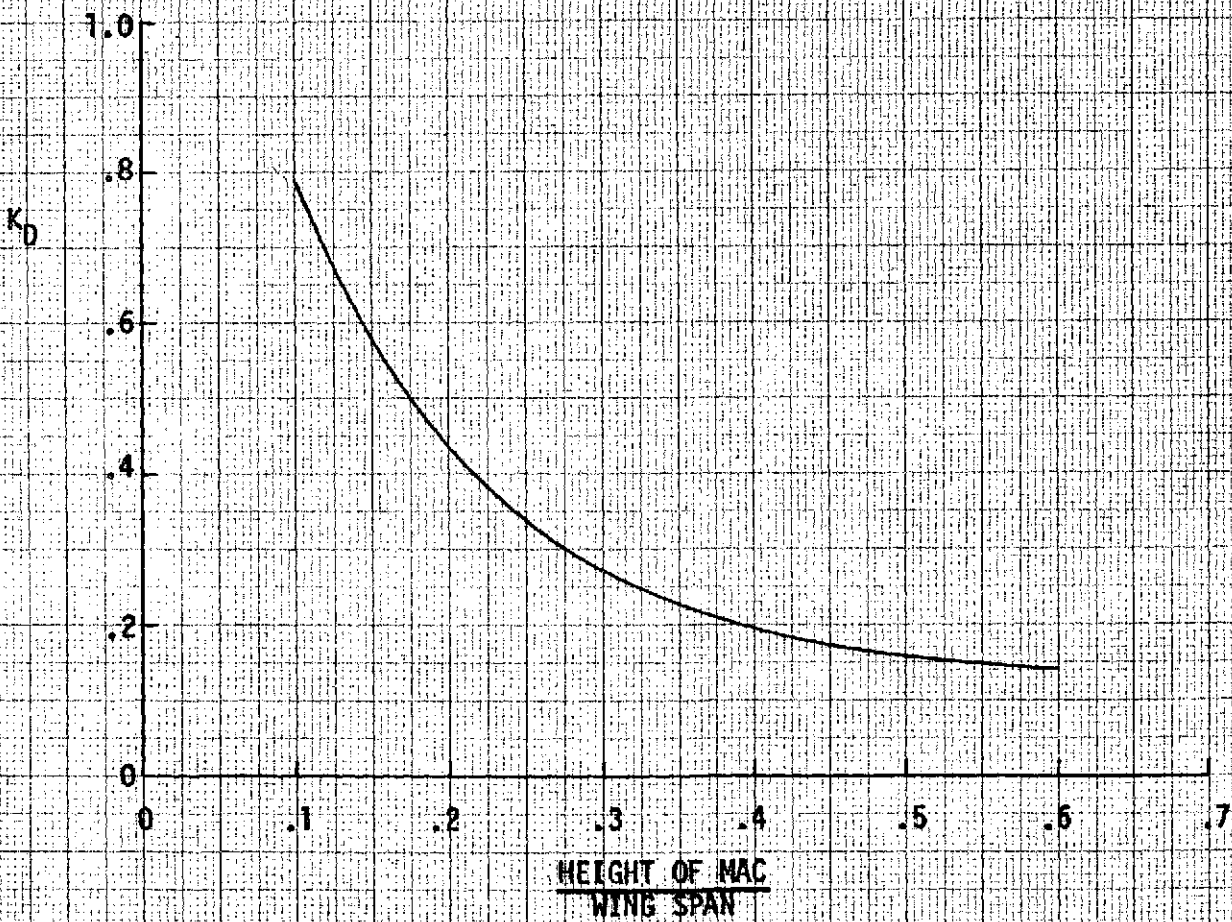
FIGURE A-18



HEIGHT CORRELATION FACTOR FOR
DRAG IN GROUND EFFECT

$$C_{D \text{ Due to Ground Effects}} = -K_D \frac{C_L^2}{\pi AR}$$

$$C_{D \text{ Ground}} = C_{D_0} + \frac{C_L^2}{\pi e AR} (1 - K_D e)$$



HEIGHT OF MAC
WING SPAN

FIGURE A-19

ADVANCED FLAP MODEL
LIFT CHARACTERISTICS IN GROUND EFFECT
MAIN GEAR ON GROUND, C.G. AT 0.25 MAC

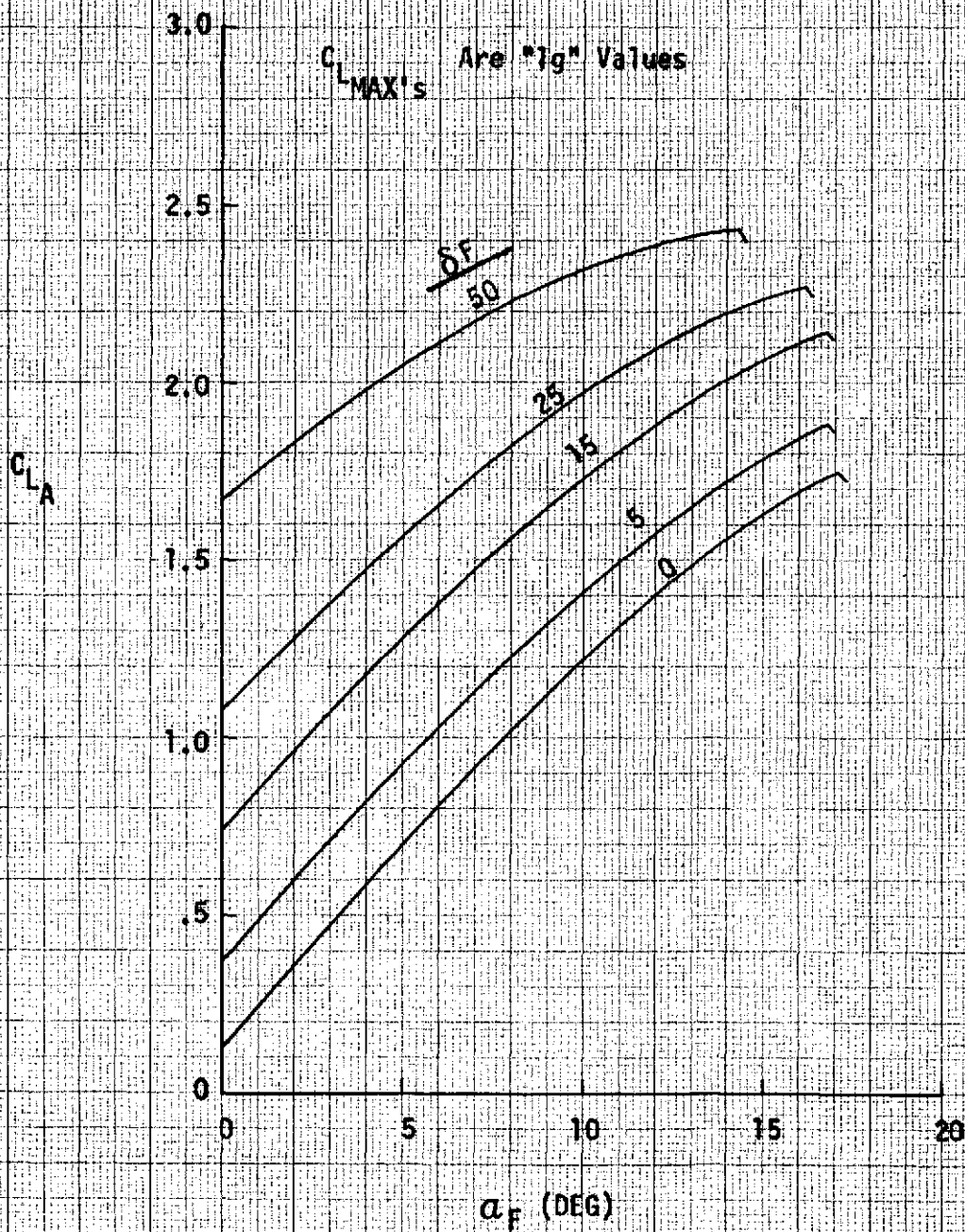


FIGURE A-20



NOMINAL FLAP MODEL
LIFT CHARACTERISTICS IN GROUND EFFECT
MAIN GEAR ON GROUND, C.G. AT 0.25 MAC

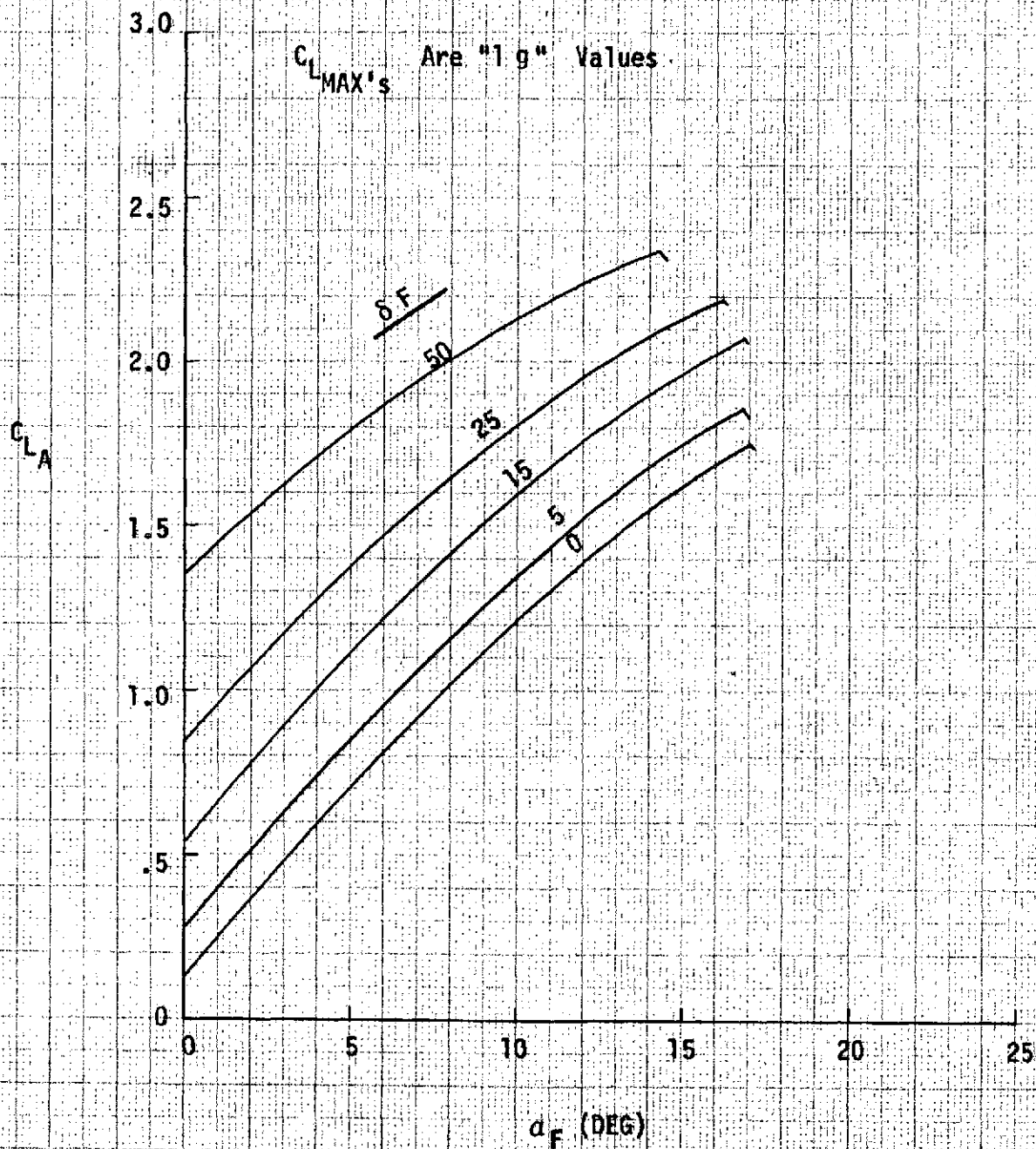


FIGURE A-21

design cruise points; in this way, the compressibility drag, which accounts for any drag increase at Mach numbers above 0.5, does not include a Reynolds number variation with Mach number.

A breakdown of the estimated zero-lift parasite drag and efficiency factor for the basepoint aircraft, section 7.2, are shown in table A-6 . The total estimated trimmed cruise configuration drag characteristics (zero-lift parasite, lift dependent, and compressibility drag) for this aircraft are shown in figure A-22 for a range of lift coefficients and Mach numbers.

TABLE A-6
LOW SPEED DRAG BREAKDOWN-BASEPOINT AIRCRAFT

50 Passenger Capacity

4500 ft (1372m) Field Length

1x850 n.mi. (1x1574km) Stage Length

<u>Item</u>	<u>Equivalent Parasite Drag Area, D/q_{∞}-ft²(m²)</u>	
Fuselage		
Friction, Form, Roughness	3.72	(0.346)
Canopy	0.18	(0.017)
Aft Fuselage Upsweep	0.22	(0.020)
Wing		
Friction, Form, Roughness	3.09	(0.287)
Flap Hinge Fairing	0.15	(0.014)
Horizontal Tail		
Friction, Form, Roughness	1.00	(0.093)
Elevator Hinge Fairings	0.05	(0.005)
Vertical Tail		
Friction, Form, Roughness	0.81	(0.075)
Nacelles and Pylons		
Friction, Form, Roughness	0.90	(0.084)
Subtotal	10.12	(0.941)
Miscellaneous Drags		
Excrescences, 7.1% of Subtotal	0.72	(0.067)
Air Conditioning, 0.7% of Subtotal	0.07	(0.007)
Control Surface Gaps	0.14	(0.013)
Contingency (5% of non-nacelle items)	0.51	(0.047)
Total Parasite Drag	11.56	(1.075)
Induced Drag Efficiency Factor	0.789	

ESTIMATED CRUISE CONFIGURATION DRAG CHARACTERISTICS
 BASEPOINT AIRCRAFT
 50 PASSENGERS
 4500 FT (1372 M) FIELD LENGTH
 1 x 850 N.MI. (1 x 1574 KM) STAGE LENGTH
 BPR 6 ENGINES

$S_{W_{REF}} = 464 \text{ FT}^2$

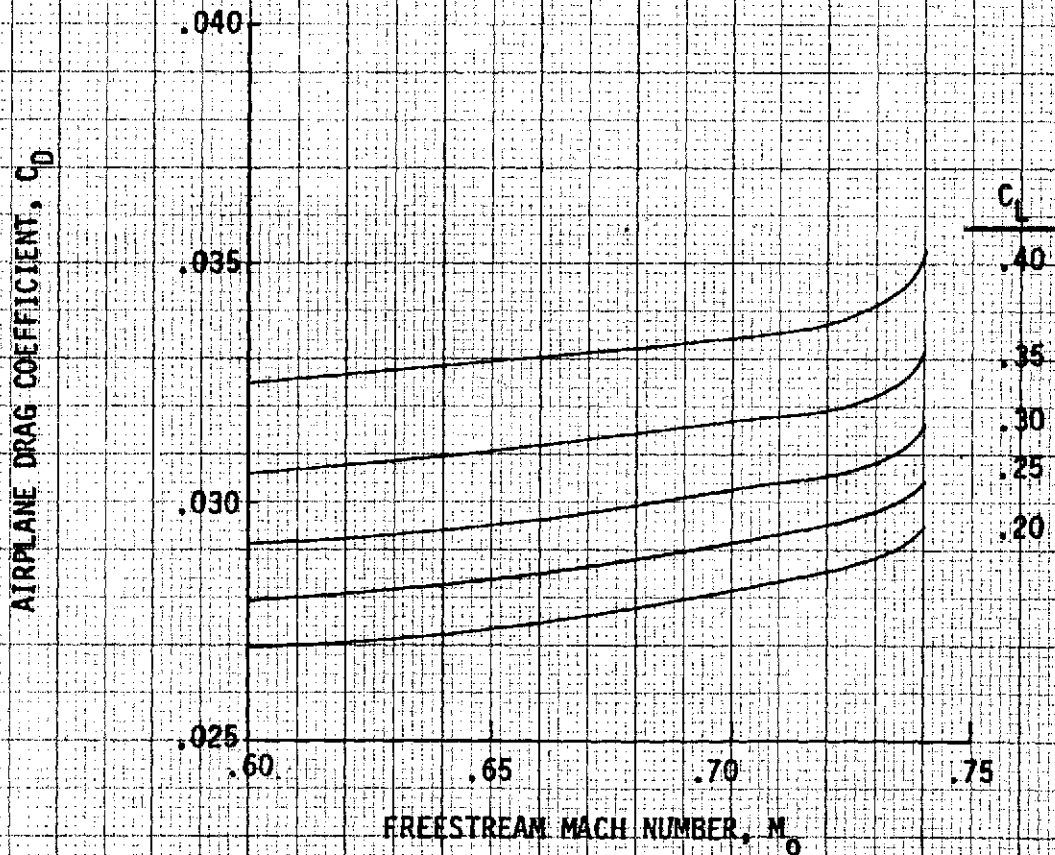


FIGURE A-22

A.3 PAYLOAD VS RANGE: FINAL DESIGN BASEPOINT

Figure A-23 is a graph showing the payload-range performance of this aircraft. At the design range of 850 nautical miles, the fuel required is 9,090 pounds including reserves. The fuel capacity of the wing (center section and outer panel) is 10,400 pounds, which provides a range of 1025 nautical miles at a payload of 8700 pounds. The addition of small belly tanks (1650 pounds requiring 34 ft³) increases the range to 1250 nautical miles at a payload of 7050 pounds. The maximum space limited payload is composed of 50 passengers and baggage, plus 50 ft³ of freight. Baggage and freight is assumed to weigh 10 lb/ft³. The weight limited payload is 54 passengers and baggage or 10,800 pounds, using a 29 inch seat pitch.

A.4 CURRENT AND PROPOSED AIRCRAFT

A.4.1 Dimensional, Weight and Performance Data

Tables A-7 and A-8 contain data necessary to define these turboprop and turbofan aircraft, respectively.

A.4.2 Payload, Block Fuel and Time vs Range

Figures A-24, A-25 and A-26 are graphs showing these performance characteristics for the turboprop aircraft. Figures A-27, A-28 and A-29 are graphs showing the same performance characteristics for the turbofan aircraft.

A.4.3 Three-View and Supporting Drawings

Table A-9 contains a list of drawings used in the Aircraft Requirements (Parametric), Design and Evaluation phases of this study.

FINAL DESIGN BASEPOINT
PAYLOAD-RANGE

CRUISE: 0.75M @ 25000 FT.

ADVANCED FLAP

- (1) DESIGN POINT: 4500 FT FIELD; 50 PSGR; 850 N. MI. RANGE
- (2) MAX. FUEL CAPACITY: WING TANKS ONLY (10,400 LB)
- (3) BELLY TANKS (1650 LB)

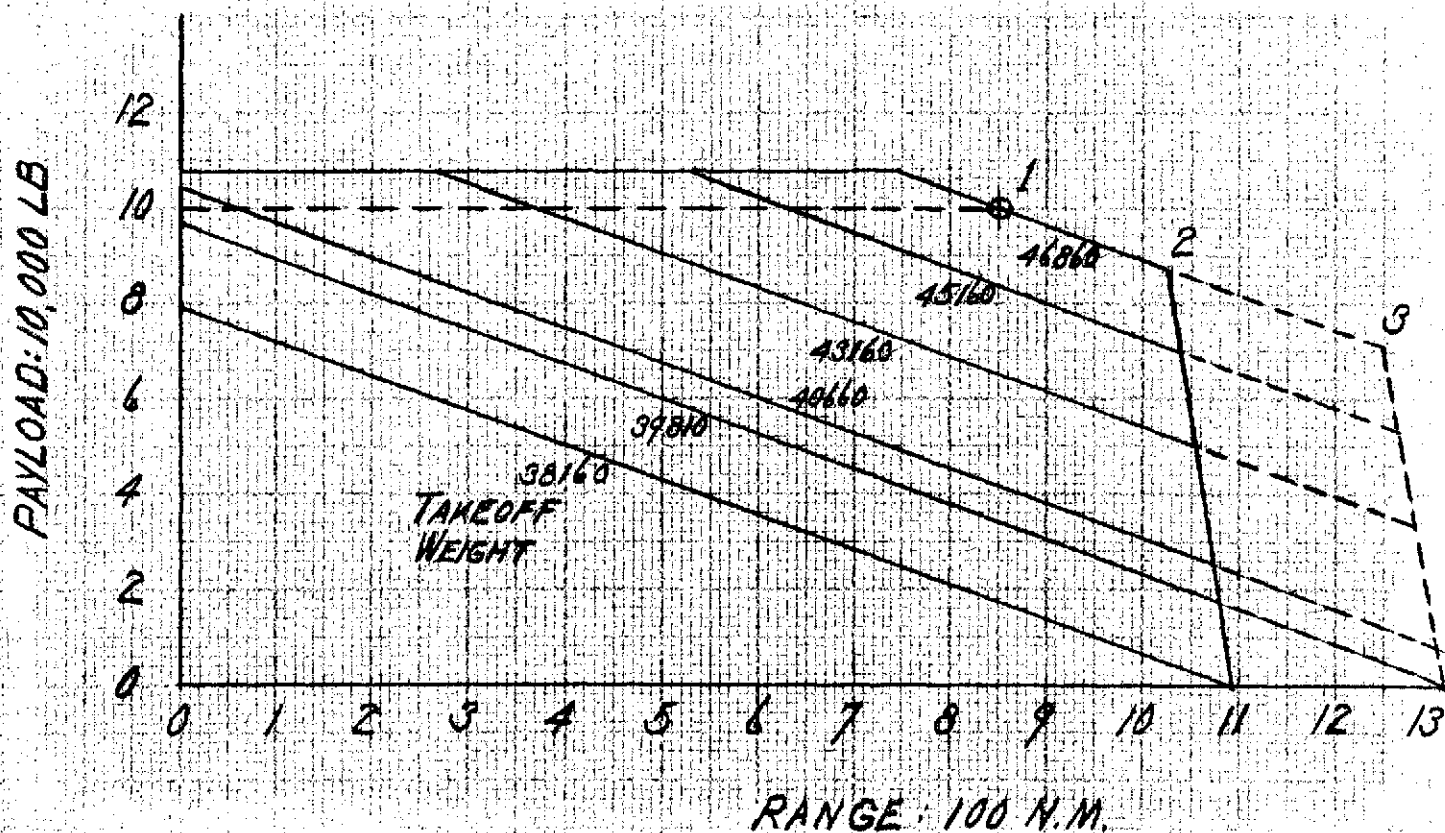


FIGURE A-23

TABLE A-7: CURRENT & EXISTING TURBOPROP AIRCRAFT

AIRCRAFT	Shorts SD 3-30	VFW-Fokker F27MK600	VFW-Fokker F27MK500	Dehavilland DHC-7	General Dynamics CV580	Nihon YS11
Engine: Type/No Mounting Wing: Position	Turboprop(2) U'Wing, Snug High	Turboprop(2) U'Wing, Snug High	Turboprop(2) U'Wing, Snug High	Turboprop(2) U'Wing, Snug High	Turboprop(2) O'Wing, Snug Low	Turboprop(2) O'Wing, Snug Low
Price: 1975 \$(10) ⁶	1.30					
Max. Takeoff Weight (lb)	21,700	43,346	45,000	41,000	53,200	50,265
Max. Zero Fuel Weight (lb)		37,500	39,500	35,500		
Max. Landing Weight (lb)	21,400	41,000	42,000	39,000	50,670	45,047
Oper. Weight Empty (psgr) (lb)	13,890	24,940	25,990	24,440		31,878
Mfgr's Weight Empty (lb)	13,290	22,744	23,536			
Cost Weight (lb)						
Max. Fuel Capacity (lb)	3,840	12,941	12,941	10,230	10,250	12,210
Max. Payload (lb)	7,500	12,560	13,510	11,060		11,907
Passenger Payload (lb)	6,000	8,827	11,235	9,120	10,400	10,318
No/No ABR/Pitch (in)	30/3/30	44/4/31-33	56/4/28.5	48/4/32	52/4/	52/4/38
Range: Psgr Payload (nm)	235/225	1,075	810	768	870	580
Cruise: Speed (LR/HS) (kn)	198	259	259	200	350	257
Altitude (ft)	10,000	20,000	20,000	15,000	15,000/20,000	20,000
Thrust/Weight: Takeoff						
Wing Loading: Takeoff (lb/ft ²)		59.7	55.7	47.7	71.0	49.4
Aspect Ratio	12.0	12.0	12.0	10.06	12.0	10.8
Sweep: 0.25 chord (deg)	0	0	0	3.5		3.0
Cabin: Diameter (in)	78	100.5	100.5	103.0		113.0
Length (ft)	31.1	47.4	52.4	40.0	39.8	47.3
Max Height (in)	78	79.5	79.5	78/73	79.0	80
Floor Width (in)	78	82.7	82.7	84.0	106.0	94
Vol: Cargo/Bagg. (ft ³)		297	297	286	402	335
Press. Diff (lb/m ²)					4.16	
FAR TOFL: Distance (ft)	3850(4300)	5480(6030)	4090(5320)	2200/2450	4,380	2,890
Weight (lb)	21,700	43,346	45,000	41,000		50,265
Condition	ISA(+15°C)	ISA(+15°C)	ISA(+15°C)	59°F/90°F		ISA
FAR Landing: Distance (ft)	3,320	3,290	3,290	2,050	4,256	3,790
Weight (lb)	21,000	36,000	36,000	39,000		48,047
Condition						
Noise: FAR 36;T.O.,LAT,(EPNdB) APPR.	85/90/95	89/93/99	89/93/99	80/82/82		
Engine: Company	P&W	R R Dart	R R Dart	P&W	Allison	R R Dart
Model	PT6A-45	RDA7MK532-7R	RDA7MK532-7R	PT6A-50	501-D1S	RDA 10/1
Rating: TO (Lb/HP)	1,120	2,140+525	2,140+525	1,174	3,750	2,660
Propeller: Company	Hartzell	Roto1	Roto1	Ham-Std	Aeroproducts	Roto1
Blade/Dia (no/ft)	5/9.0	4/11.5	4/11.5	4/11.25	4/13.5	4/14.5

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TABLE A-8: CURRENT & EXISTING TURBOFAN AIRCRAFT

AIRCRAFT	Dassault-Breguet Falcon 30 Turbofan(2) Aft Fuselage Low	VFW-Fokker VFW614 Turbofan(2) Overwing, Pylon Low	VFW-Fokker F28MK1000/5000 Turbofan(2) Aft Fuselage Low	VFW-Fokker F28MK2000/6000 Turbofan(2) Aft Fuselage Low	Hawker-Siddeley HS146-100 Turbofan(4) Underwing Pylon High	Hawker-Siddeley HS146-200 Turbofan(4) Underwing Pylon High
Engine: Type/No Mounting Wing: Position						
Price: 1975 \$(10) ⁻⁶						
Max. Takeoff Weight (lb)	35,275	44,000	65,000/70,800	65,000/70,800	72,000	
Max. Zero Fuel Weight (lb)	29,320	36,600	54,500	54,500/56,000	60,500	
Max. Landing Weight (lb)	32,190	44,000	59,000/64,000	59,000/64,000	70,000	
Operating Weight Empty (Psgr) (lb)	21,820	27,560	35,464/37,437	36,953/38,775	41,130	
Manufacturers Weight Empty (lb)		26,130	34,470/36,443	35,943/37,765		
Cost Weight (lb)						
Max. Fuel Capacity (lb)	9,350		16,982/22,736	16,982	17,850	
Max. Payload (lb)	7,500	9,040	19,036/17,063	17,547/17,225	19,370	
Passenger Payload (lb)	5,700	8,200/	12,000	15,000	14,200	
No./No. ABR/Pitch (in)	30/3/31	40-44/4/32-33	60/5/32-33	75/5/31-32	71/5/33	(NOT AVAILABLE)
Range: Psgr Payload (nm)	835					
Cruise: Speed (LR/HS) (kn)	445	397	440	440	425	
Altitude (ft)	25,000	21,000/25,000			22,000	
Thrust/Weight: Takeoff	0.344	0.340	0.303/0.278	0.303/0.278	0.361	
Wing Loading: Takeoff (lb/ft ²)	66.6	64.0	79.1/83.4	79.1/83.4	86.5	
Aspect Ratio	6.58	7.22	7.27/8.00	7.27/8.00	9.00	
Sweep: 0.25 Chord (deg)	29.55	15.0	16.0	16.0	15.0	
Cabin: Diameter (in)	96.0	104.7	120.2	120.2	140.0	
Length (ft)	37.0	36.8	43.0	50.3	50.6	
Max. Height (in)	73.0	76.8	79.3	79.3		
Floor Width (in)	72.5	90.				
Volume: Cargo/Bag (ft ³)	220	194-114	460	557	517	
Press. Diff. (lb/in ²)	8.5	6.55	7.45	7.45	6.5	
FAR TOFL: Distance (ft)	5000(5180)	4,000	5,490/5,860	5,490/5,860	3,500	
Weight (lb)	35,275	44,000	65,000/70,800	65,000/70,800	72,000	
Condition	SL,ISA(+10°C)		SL,ISA	SL,ISA	SL,ISA	
FAR Landing: Distance (ft)	4,000	3,600	3,540/3,120	3,540/3,120		
Weight (lb)	32,190	44,000	59,000/64,000	59,000/64,000		
Condition						
Noise: FAR 36; T.O.,LAT., APPR. (EPNdB)		89/95/96	93/103/102	93/103/102		
Engine: Company	Avco-Lycoming	R.R. Bristol	R.R. Spey	R.R. Spey	Avco-Lycoming	
Model	ALF 502-D	SNECMA M45H-01	MK555-15/15H	MK555-15/15H	ALF 502H	
Rating: T.O. (lb/HP)	6,070	7,473	9,850	9,850	6,500	
Propeller: Company	---	---	---	---	---	
Blade/Diam (no/ft)	---	---	---	---	---	

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TURBOPROP AIRCRAFT

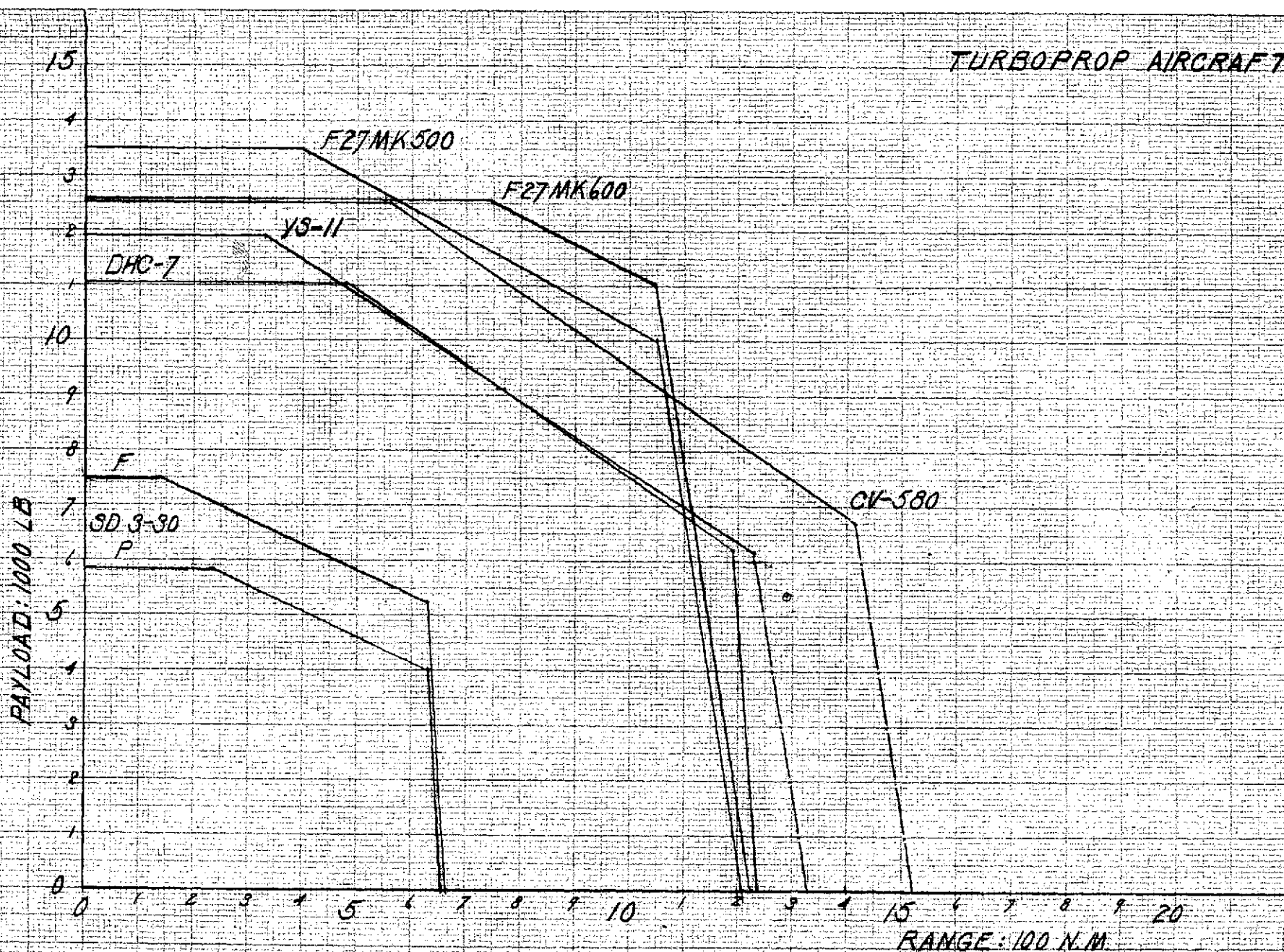


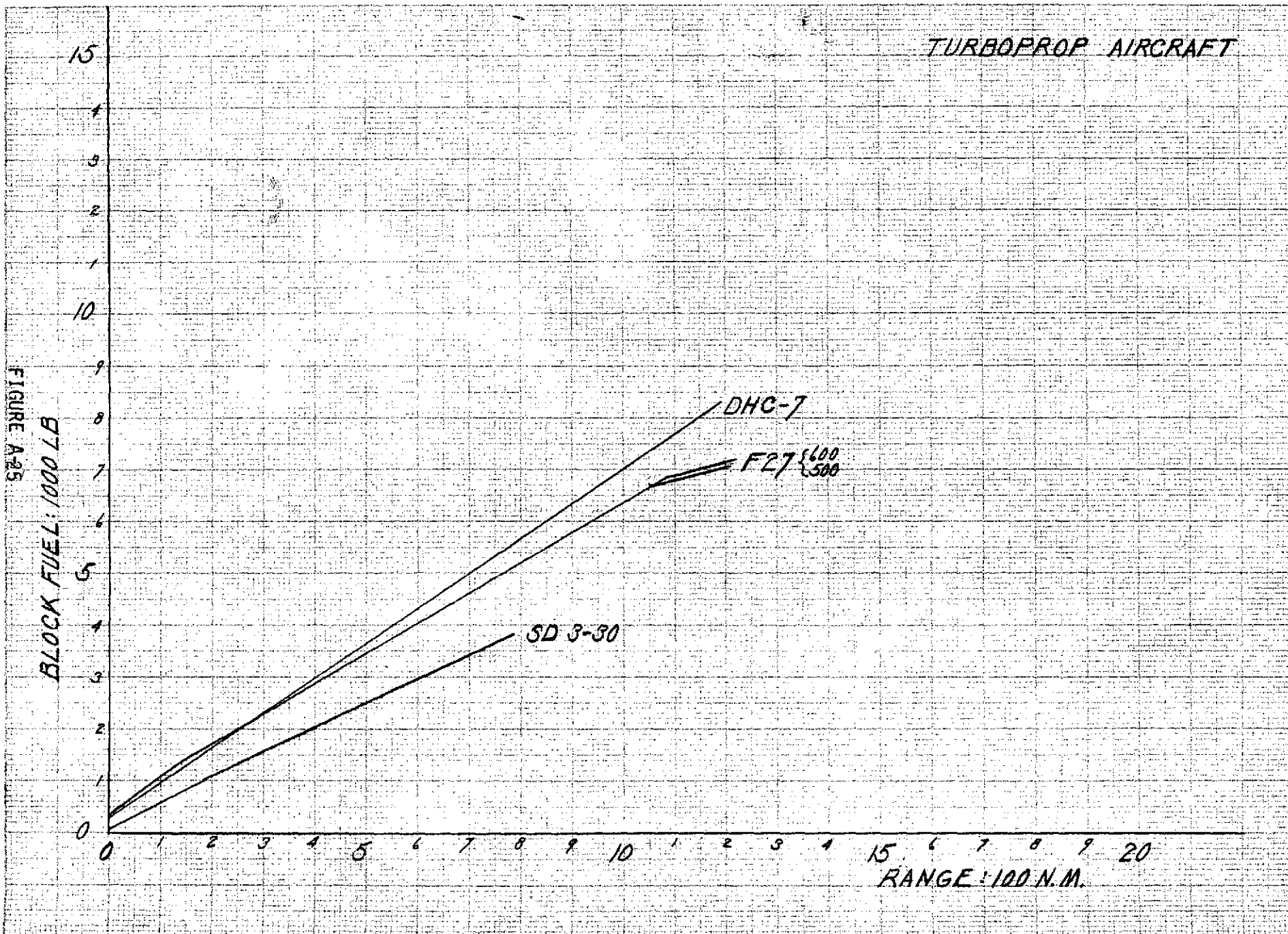
FIGURE A-24

A-40

DOUGLAS

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TURBOPROP AIRCRAFT



DOUGLAS

TURBOPROP AIRCRAFT

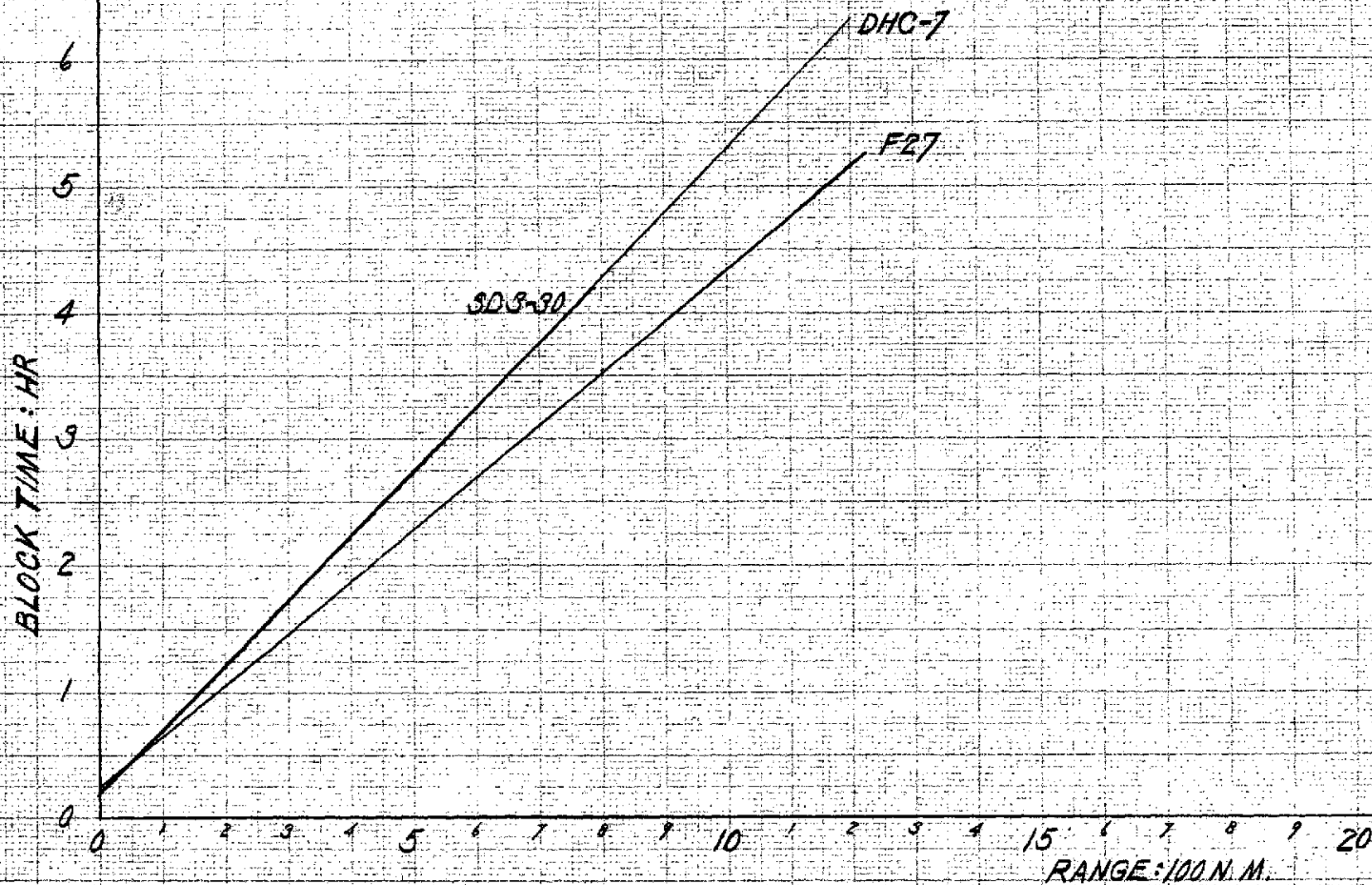
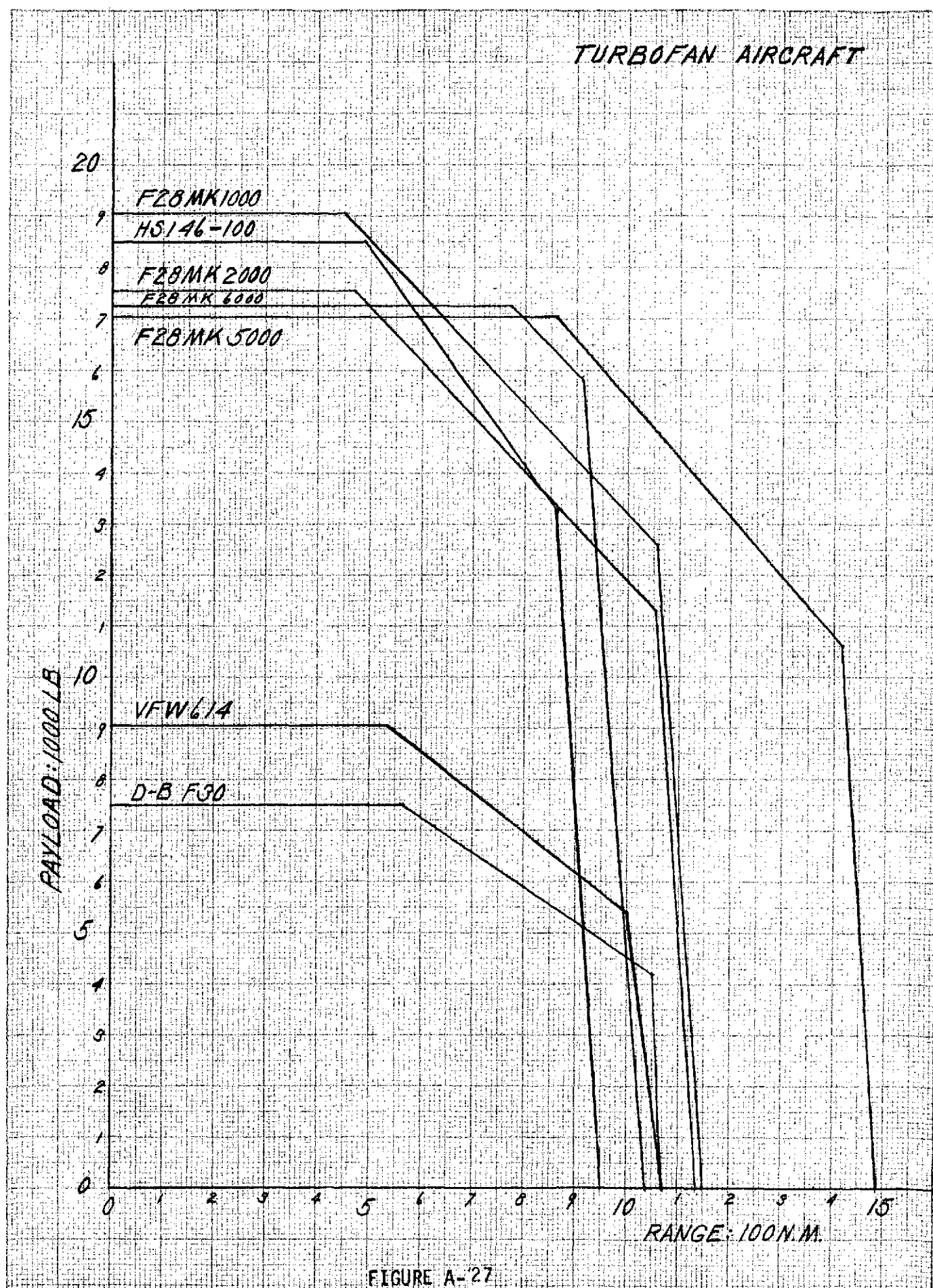


FIGURE A-26

A-42





TURBOFAN AIRCRAFT

BLOCK FUEL: 1000 N.M.

FIGURE A-28

A-44

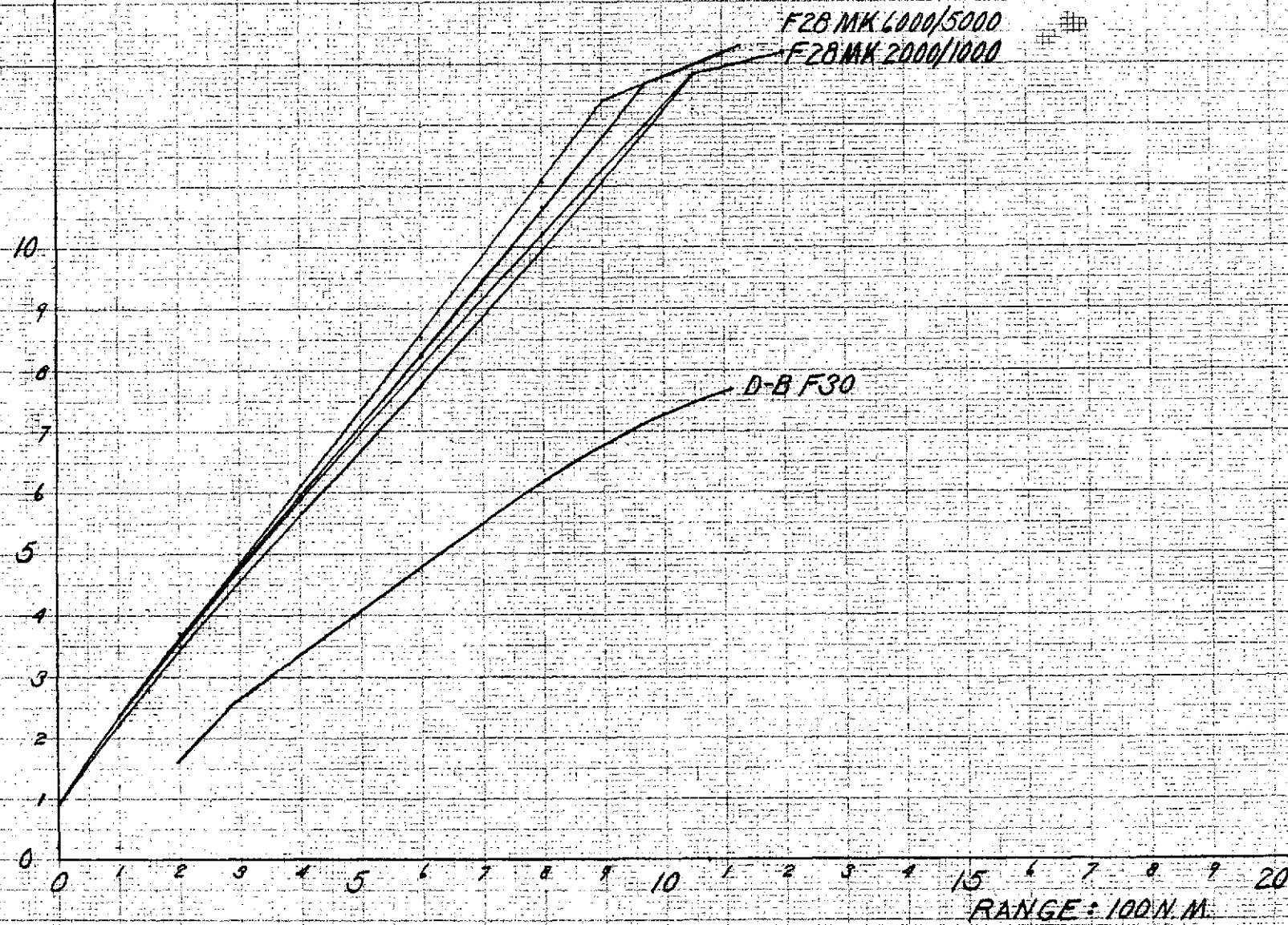


FIGURE A-29
A-45

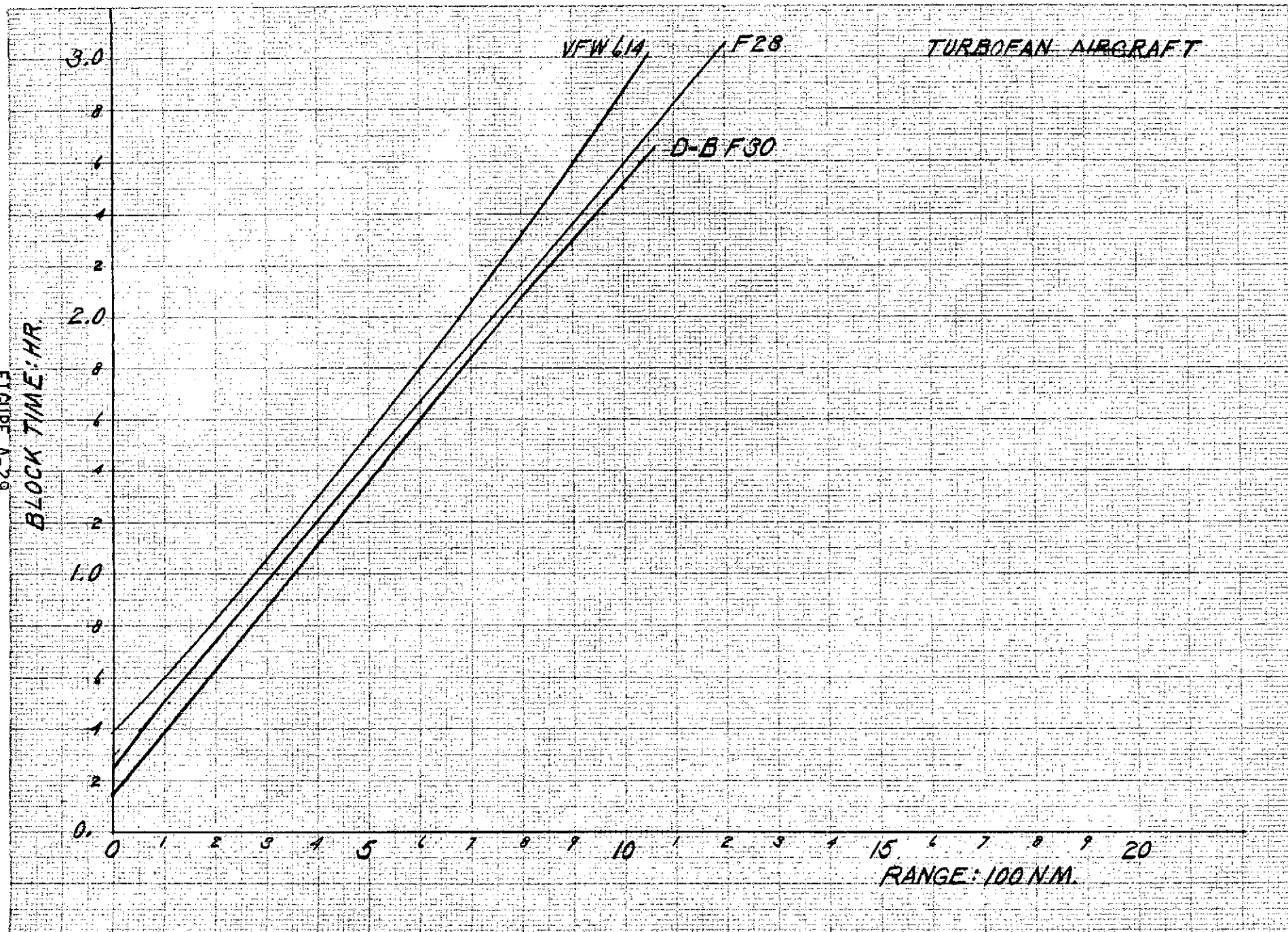


Table A-9
THREE-VIEW & SUPPORTING DRAWINGS

DWG.NO. (Fig. No.)	TITLE	STUDY PHASE	DESCRIPTION			
			Psgr. (No.)	Field Length (Ft)	Range (N.Mi.)	Engine
J112133A (A-30)	General Arrangement (Baseline)	Parametric	50	4,500	2 x 250	F.P. Fan (2)
J112146 (A-31)	General Arrangement	Parametric	30	4,500	2 x 250	F.P. Fan (2)
J112148 (A-32)	General Arrangement	Parametric	70	4,500	2 x 250	F.P. Fan (2)
J112184 (A-33)	General Arrangement	Parametric	50	4,500	2 x 250	V.P. Fan (2)
J112141A (A-34)	General Arrangement	Parametric	50	4,500	2 x 250	Turboprop (2)
J112207A (A-35)	General Arrangement (Basepoint)	Design	50	4,500	1 x 850	F.P. Fan (2)
J112187A (A-36)	General Arrangement	Design	50	4,500	1 x 850	Turboprop (2)
J112219 (A-37)	General Arrangement	Design	50	4,500	1 x 850	Avco-Lycoming (4) ALF502
J112248 (A-38)	General Arrangement (Shrink)	Design & Evaluation	42	<4,500	--	F.P. Fan (2)
J112249 (A-39)	General Arrangement (Str/Shr. Base)	Design & Evaluation	50	4,500	1 x 850	F.P. Fan (2)
J112250 (A-40)	General Arrangement (Stretch)	Design & Evaluation	70	>4,500	--	F.P. Fan (2)
J112239 (A-41)	Fuselage Study (Stretch/Shrink)	Design & Evaluation				
J112128B (A-42)	Fuselage Cross Section (Cusped)	Design & Evaluation				
J112220 (A-43)	Alt. Body Section (Circular)	Design & Evaluation				
J112139 (A-44)	Fwd. Engine Arrangements	Design & Evaluation				

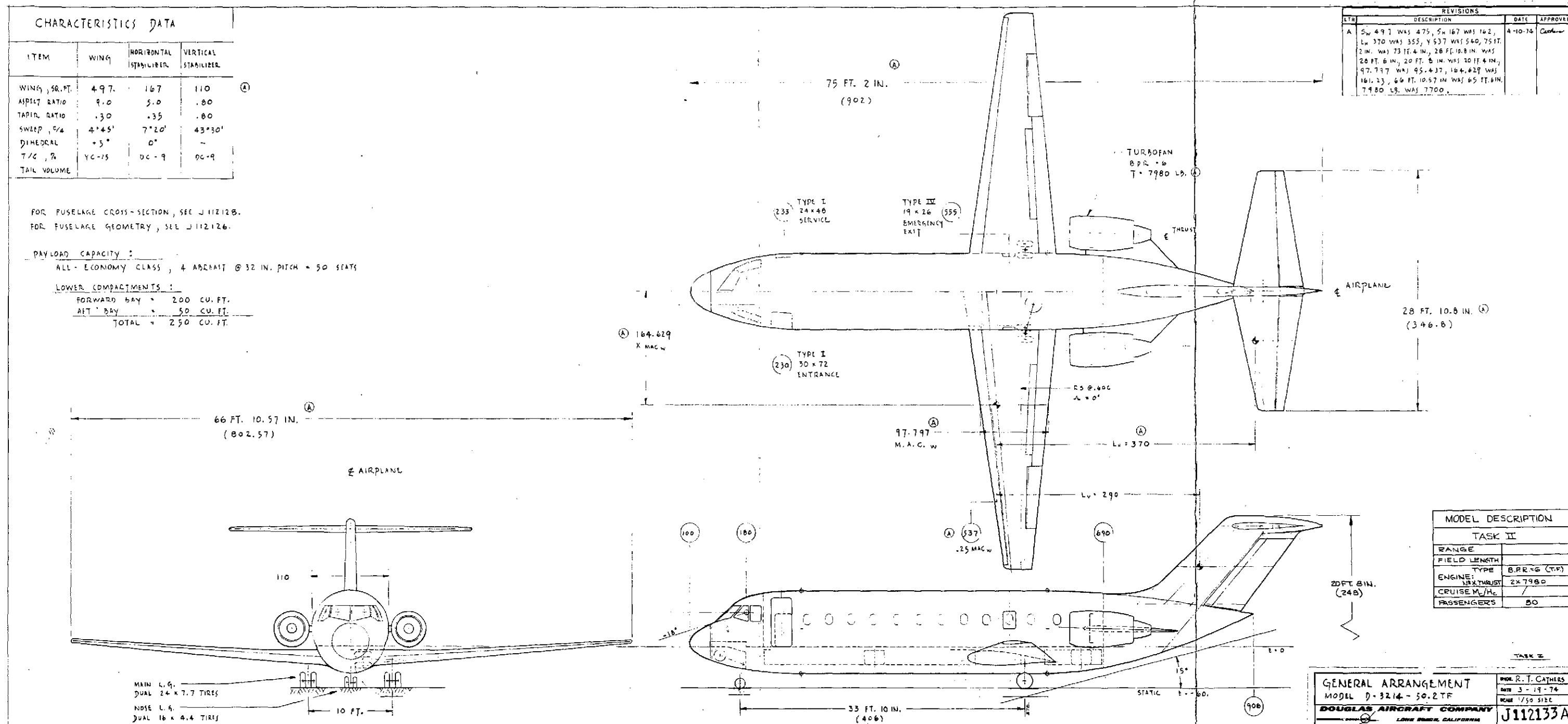


FIGURE A-30

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CHARACTERISTICS DATA			
ITEM	WING	H. TAIL	V. TAIL
AREA, FT ²	363.3	128	83
ASPECT RATIO	9.0	5.0	.80
TAPER RATIO	.30	.35	.80
SWEEP	4°45'	7°20'	43°30'
DIHEDRAL	5°	0°	~
T/C	YC-15	DC-9	DC-9
TAIL VOLUME	~	1.27	.08

FOR FUSELAGE CROSS-SECTION, SEE J112128.
 FOR FUSELAGE GEOMETRY, SEE J112125.

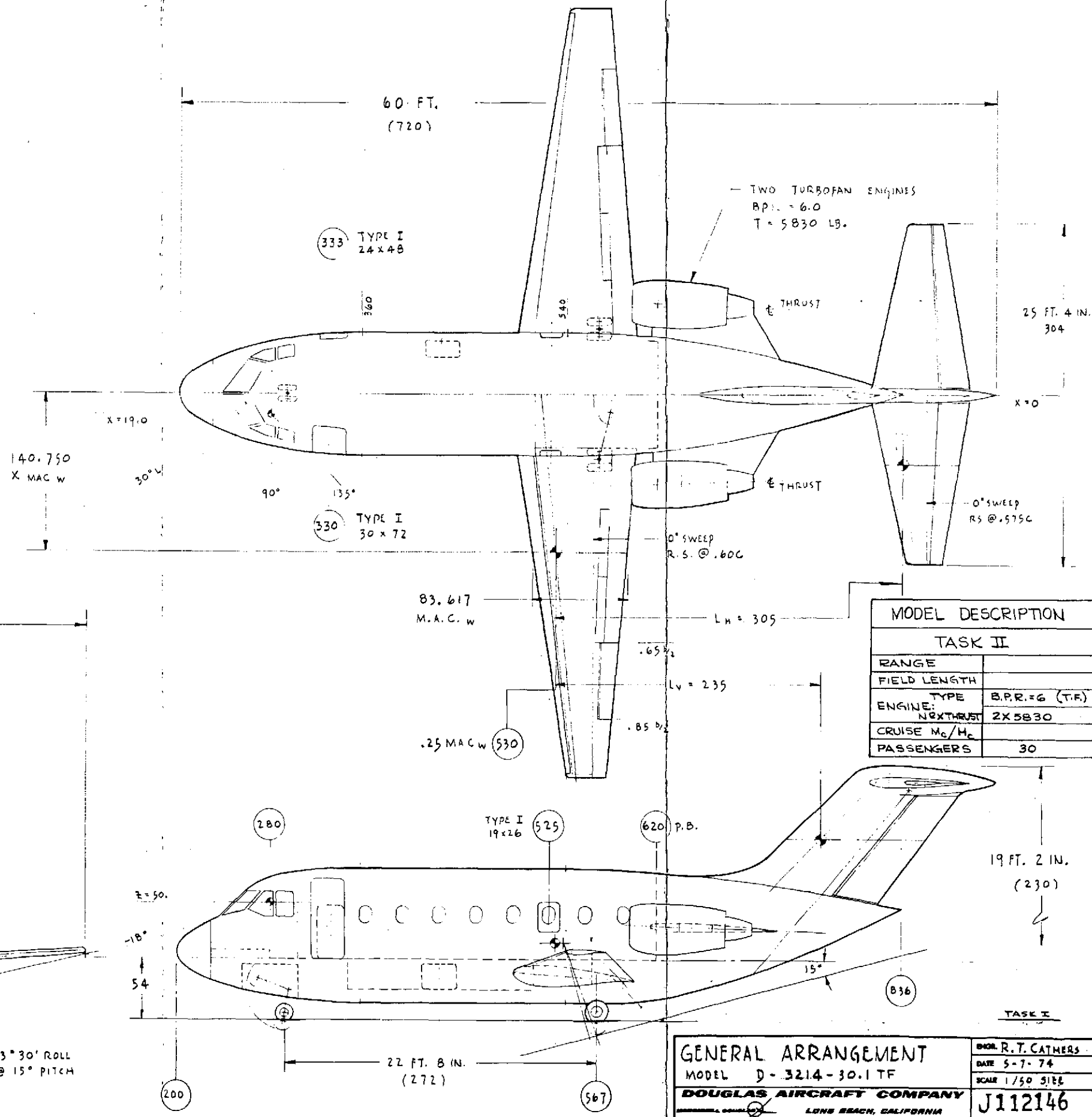
PAYLOAD CAPACITY ~

ALL-ECONOMY CLASS = 4 ACREAST @ 32 IN. PITCH = 30 SEATS.

CARGO VOLUME

FORWARD LOWER BAY = 110 CU. FT.

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FIGURE A-31

A-48

CHARACTERISTICS DATA			
ITEM	WING	HORIZONTAL STABILIZER	VERTICAL STABILIZER
WING, SQ. FT.	642.4	206.2	132.1
ASPECT RATIO	9.0	5.0	0.80
TAPER RATIO	0.30	0.35	0.80
SWEEP, $\frac{1}{2}$	4°53'	7°45'	43.5°
DIHEDRAL	+5°	0°	~
T/C, %	YC-15	DC-9	DC-9
TAIL VOLUME	~	1.27	0.08

*FOR FUSELAGE CROSS-SECTION, SEE J112125.
 *FOR FUSELAGE GEOMETRY, SEE J112127.

***PAYLOAD CAPACITY:**

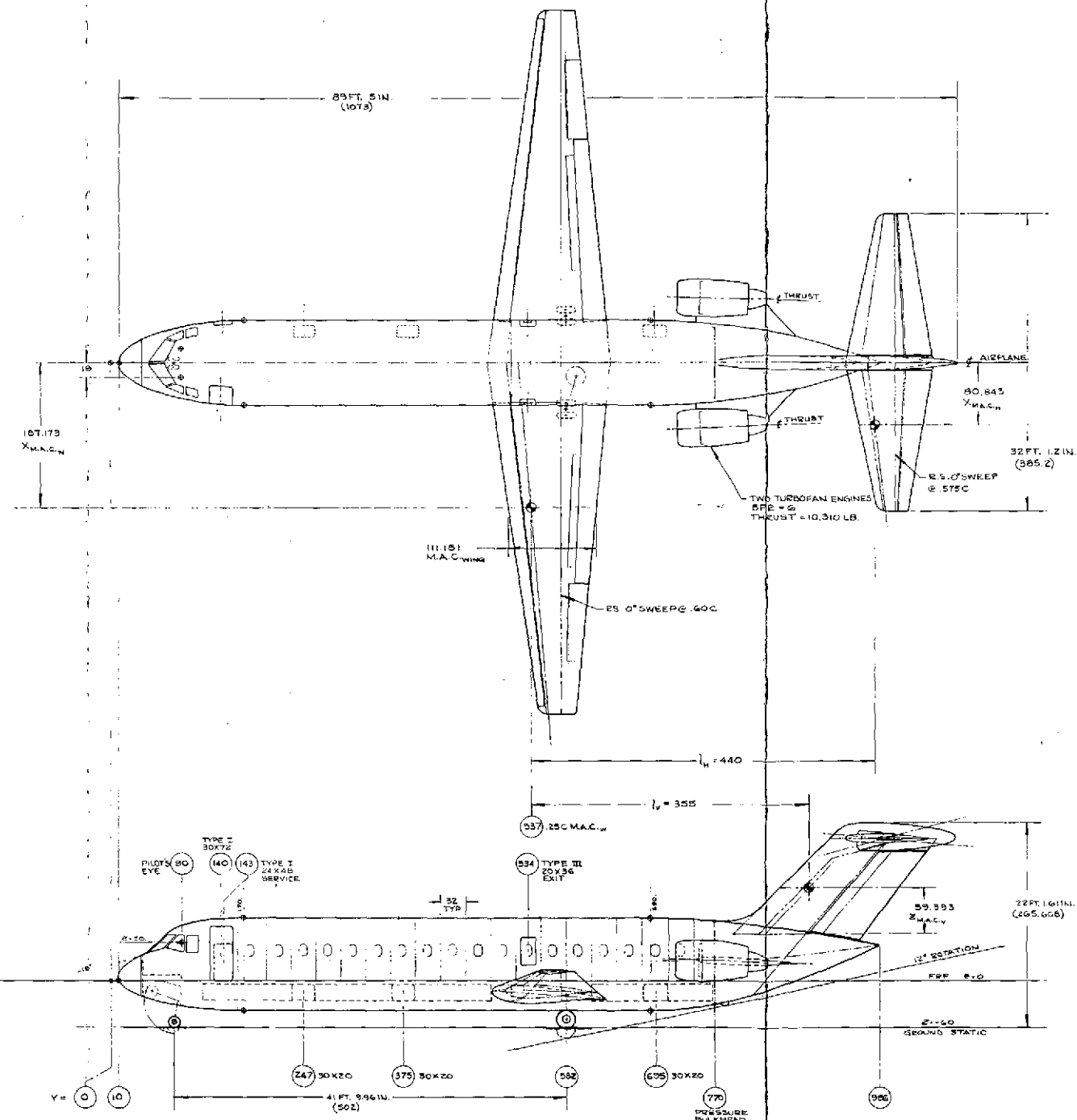
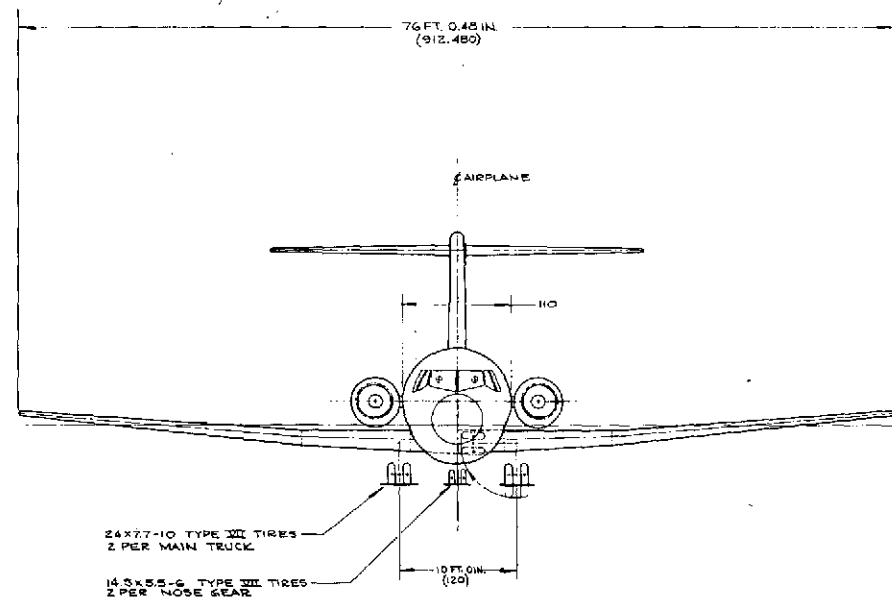
ALL-ECONOMY CLASS, 4 ABREAST @ 32 IN. PITCH = 70 SEATS

LOWER COMPARTMENTS:

FORWARD BAY = 260 CU. FT.

AFT BAY = 105 CU. FT.

TOTAL = 365 CU. FT.



MODEL DESCRIPTION	
TASK II	
RANGE	
FIELD LENGTH	
ENGINE TYPE	B.R.E.W. (TR)
ENGINE INTAKE	2 X 10,310 LB.
Cruise M/M	
PASSENGERS	70

GENERAL ARRANGEMENT	
MODEL D-3214-70.1 TT	REV 5-10-74
DOUGLAS AIRCRAFT COMPANY	REV 1/50 SIZE
J112148	

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FIGURE A-32

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A-49

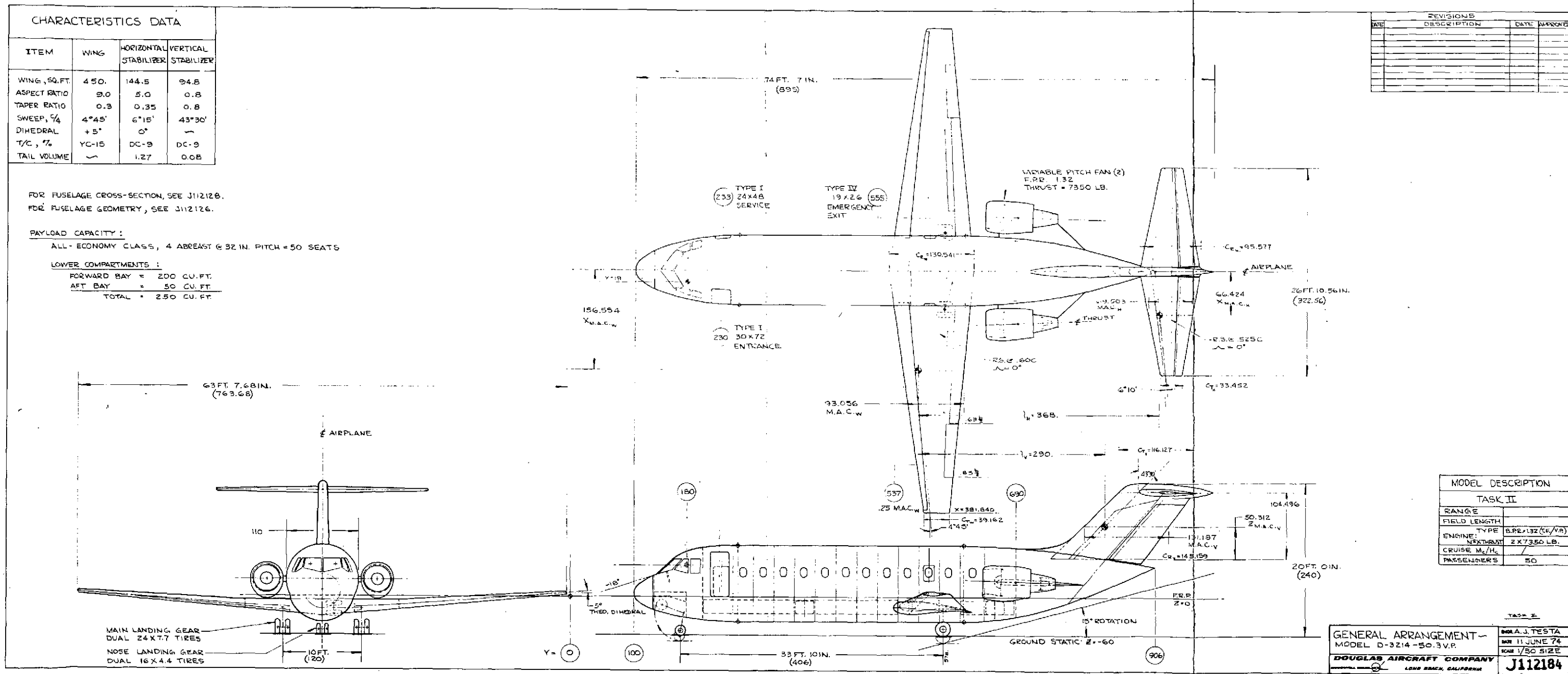


FIGURE A-33

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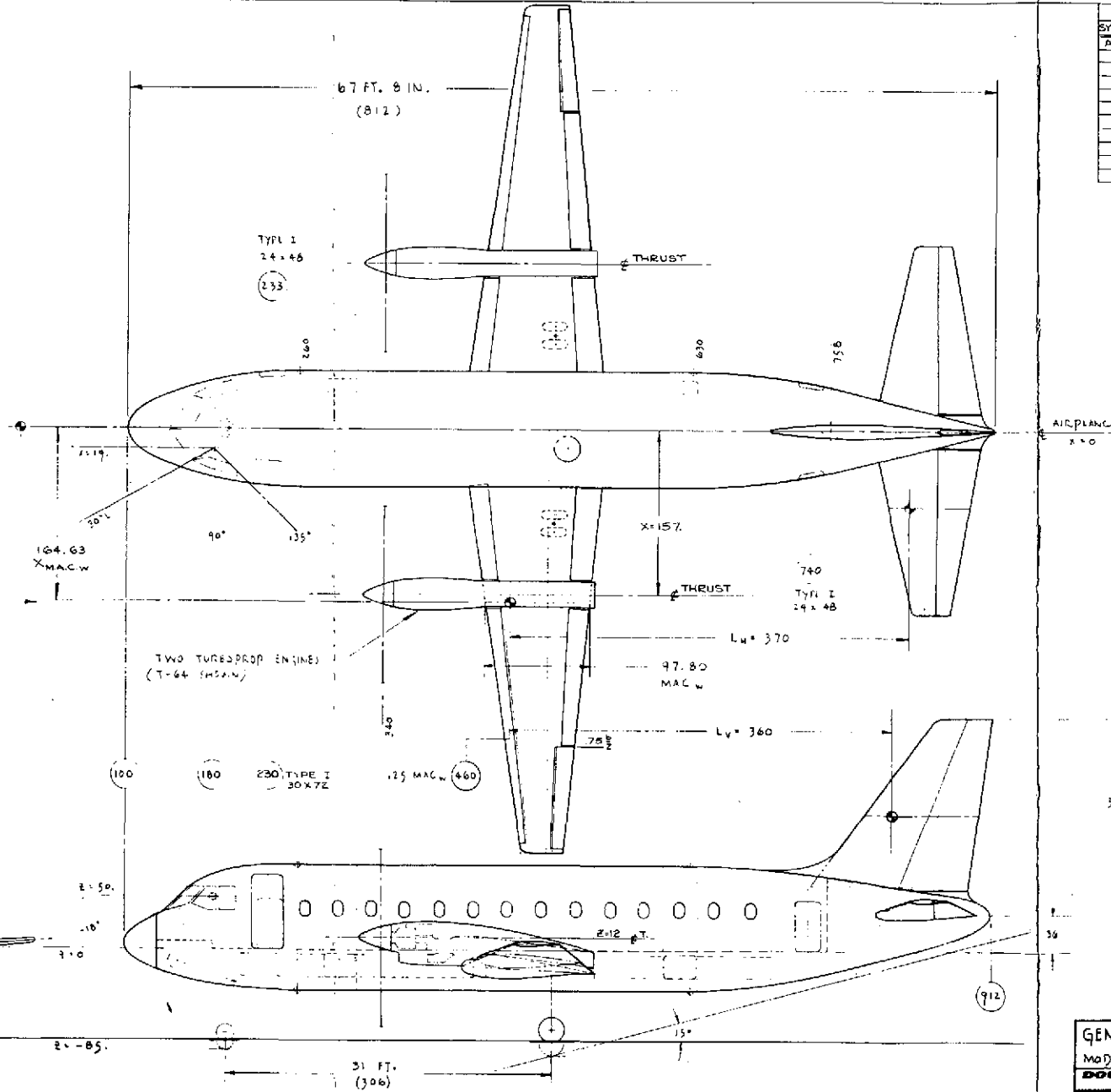
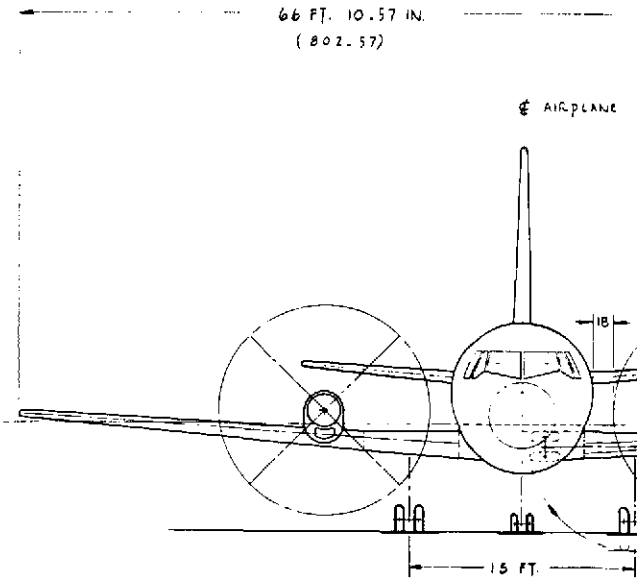
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A-50

CHARACTERISTICS DATA			
ITEM	WING	HORIZONTAL STABILIZER	VERTICAL STABILIZER
AREA, SQ. FT.	497	170	110
ASPECT RATIO	9.0	5.0	1.60
TAPER RATIO	.30	.35	.35
SWEEP	4° 45'	7° 20'	30°
DIHEDRAL	5°	5°	~
TAIL VOLUME		1.27	.12

FOR FUSELAGE CROSS-SECTION, SEE J11212B.
FOR INTERIOR ARRANGEMENT, SEE SHEET II.

PAYLOAD CAPACITY:
ALL-ECONOMY CLASS, A ABSENT @ 32 IN. PITCH = 50 SEATS
LOWER COMPARTMENTS:
FORWARD BAY = 150 CU. FT.
AFT BAY = 100 CU. FT.
TOTAL = 250 CU. FT.



REVISIONS		
SYM	DESCRIPTIONS	DATE APPROVAL
A	RELOCATED ENGINE & THRUST X=157. WAS X=163, Z=12 WAS Z=16, CHANGED PROPELLER DIA. 14 FT. WAS 15 FT. AILE .75 WAS .80, ADDED DIMS 13&18.	5-14-74 J. TESTA

TASK I	
GENERAL ARRANGEMENT	BY: R.T. GATHERS
MODEL 7-3215-50-1 T.P.	DATE: 4-17-74
DOUGLAS AIRCRAFT COMPANY	SCALE: 1/50 SIDE
LONG BEACH, CALIFORNIA	J112141A

FIGURE A-34

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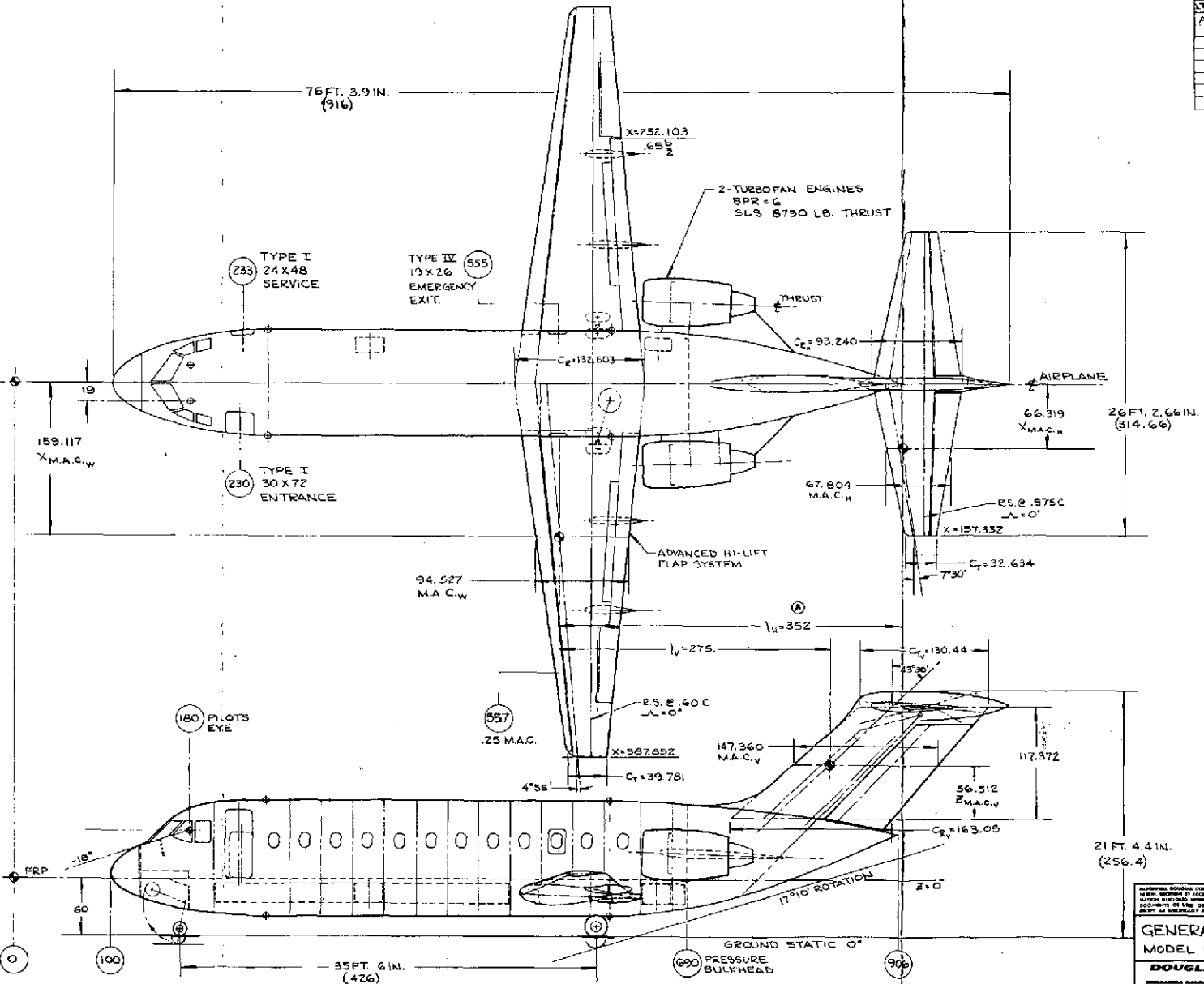
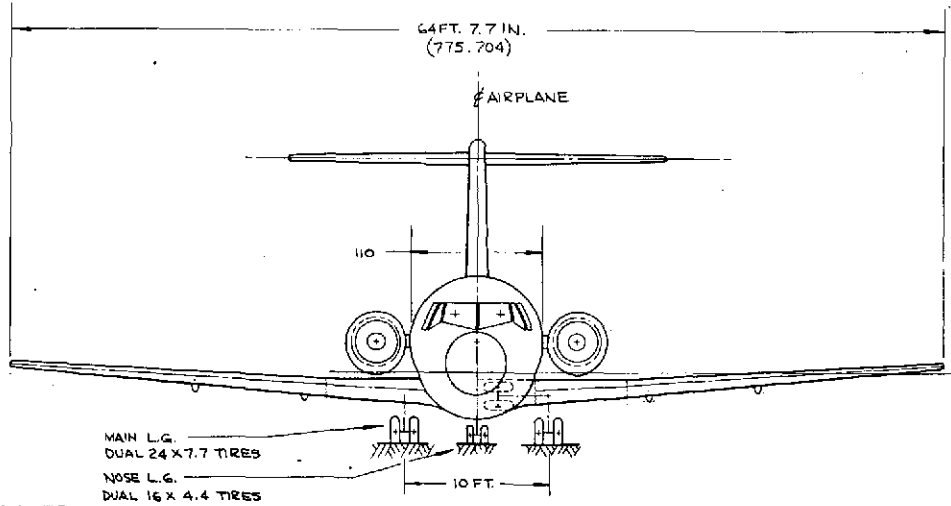
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CHARACTERISTICS DATA			
ITEM	WING	HORIZONTAL STABILIZER	VERTICAL STABILIZER
WING, SQ. FT.	464.3	137.5	119.6
ASPECT RATIO	9.0	5.0	.80
TAPER RATIO	.30	.35	.80
SWEEP, $\frac{C}{4}$	4°55'	7°30'	43°30'
DIHEDRAL	+5°	0°	—
γ_0 , %	YC-15	DC-9	DC-9
TAIL VOLUME	—	1.103	.091

FOR FUSELAGE CROSS-SECTION SEE J112128
FOR FUSELAGE GEOMETRY, SEE J112126

PAYLOAD CAPACITY:
ALL - ECONOMY CLASS, 4 ABREAST @ 32 IN. PITCH = 50 SEATS

LOWER COMPARTMENTS:
FORWARD BAY = 200 CU. FT.
AFT BAY = 30 CU. FT.
TOTAL = 230 CU. FT.



REV	DESCRIPTION	DATE	APPROVED
A	RESIZED BASELINE S _W =464.3 WAS S _W =465.4, S _H =137.5 WAS S _H =179.9, HORIZ. TAIL VOL. = 1.103 WAS 1.43, 1 _H =352 WAS 350	6-12-74	A.J. TESTA

MODEL DESCRIPTION	
TASK II	
RANGE	
FIELD LENGTH	
ENGINE TYPE	B.P.R. = 6 (TP)
MAXIMUM THRUST	2 X 8790 LB.
CRUISE M ₀ /H ₀	
PASSENGERS	50

GENERAL ARRANGEMENT - MODEL D-3214-50.4 TF	
DOUGLAS AIRCRAFT COMPANY	
LONG BEACH, CALIFORNIA	
ENGR. A. J. TESTA	DATE 15 JULY 1974
SCALE 1/50 SIZE	J112207A

FIGURE A-35

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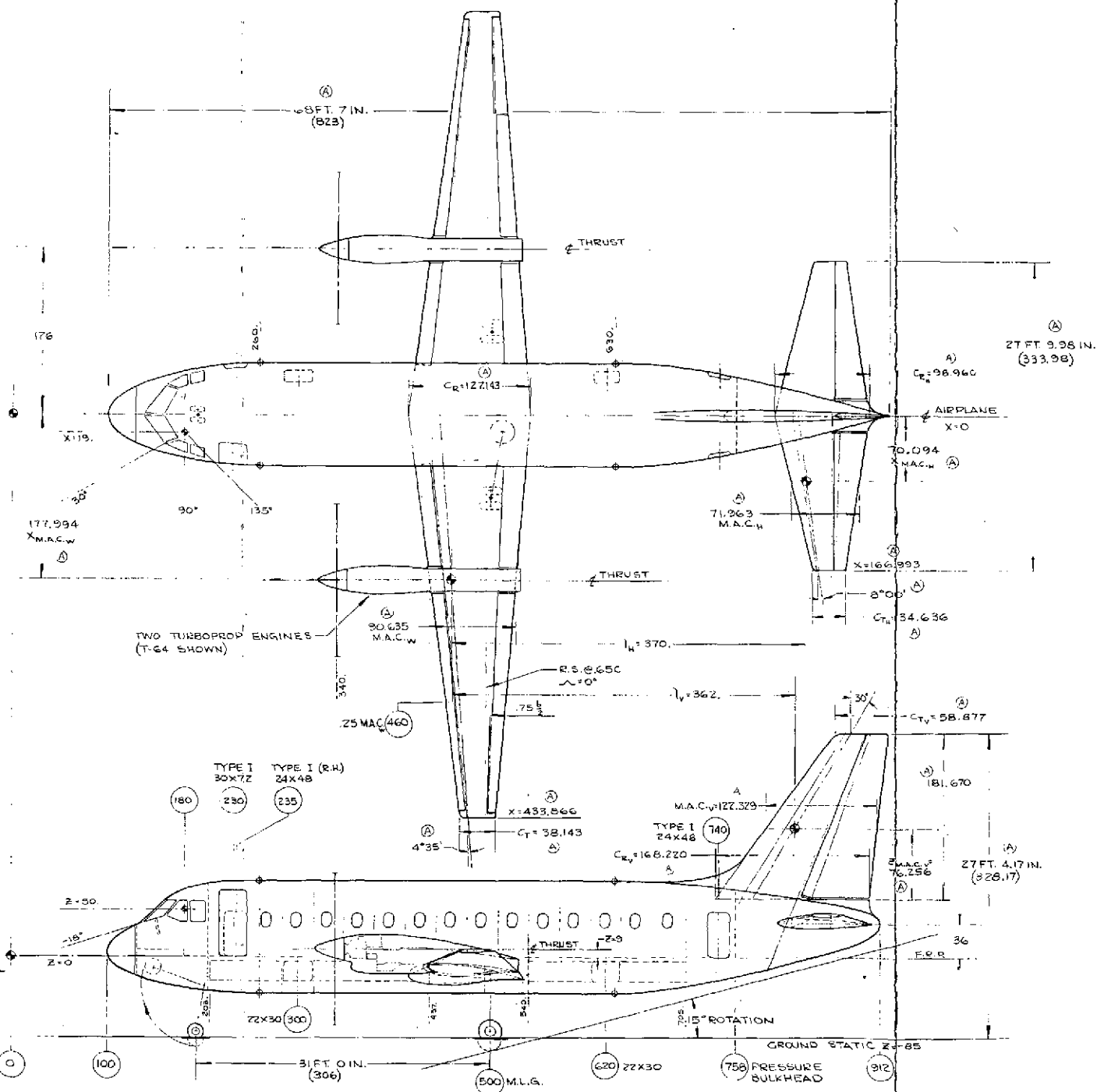
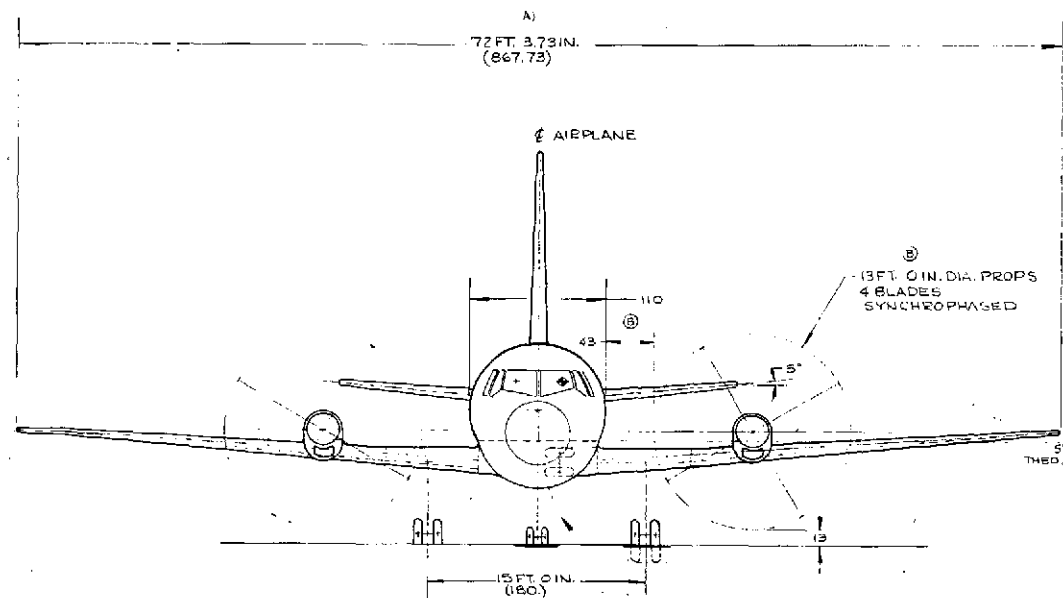
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CHARACTERISTICS DATA			
ITEM	WING	HORIZONTAL STABILIZER	VERTICAL STABILIZER
AREA SQ. FT.	496	154.9	143.2
ASPECT RATIO	10.5	5.0	1.6
TAPER RATIO	0.30	0.35	0.35
SWEEP	4°35'	8°00'	30°
DIHEDRAL	5°	5°	✓
TAIL VOLUME	✓	1.27	0.12

FOR FUSELAGE CROSS-SECTION, SEE J112128.
FOR INTERIOR ARRANGEMENT, SEE SHT. II.

PAYLOAD CAPACITY:
ALL - ECONOMY CLASS, 4 ABREAST @ 32 IN. PITCH = 50 SEATS

LOWER COMPARTMENTS:
FORWARD BAY = 150 CU. FT.
AFT BAY = 100 CU. FT.
TOTAL = 250 CU. FT.



REV	DESCRIPTIONS	DATE	APPROVAL
A	AIRPLANE CHARACTERISTICS AND DIMENSIONS REVISED AS SHOWN PER AERO. APT. HB-74-008-RDW DTD 8-6-74.	8-9-74	A. J. TESTA
B	CHANGED DIMS. 13'0" DIA. PROP WAS 13'6" 43 WAS 40.	10-9-74	A. J. TESTA

GENERAL ARRANGEMENT - MODEL D-3215-50.2 TP		DRG. A. J. TESTA
DOUGLAS AIRCRAFT COMPANY		DATE 14 JUNE 74
LONG BEACH, CALIFORNIA		SCALE 1/50 SIZE
		J112187B

FIGURE A-36

A-53

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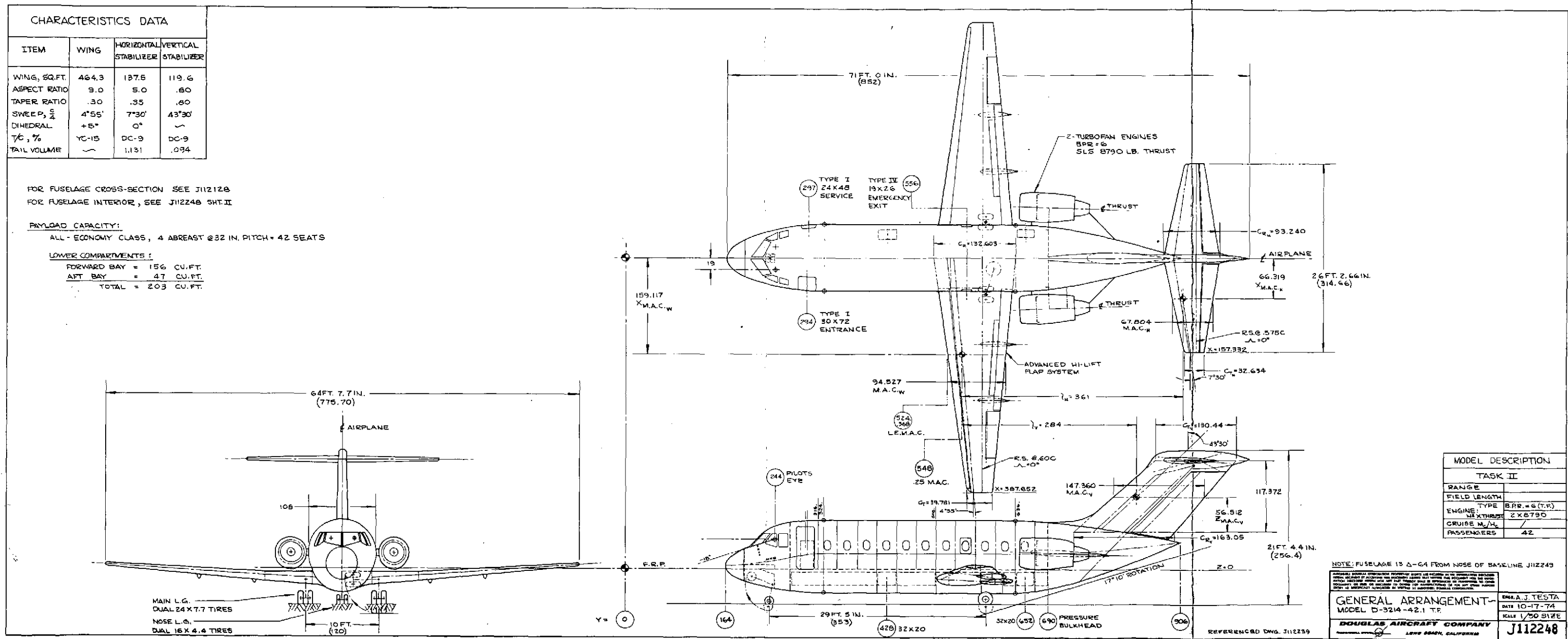


FIGURE A-38

A-55

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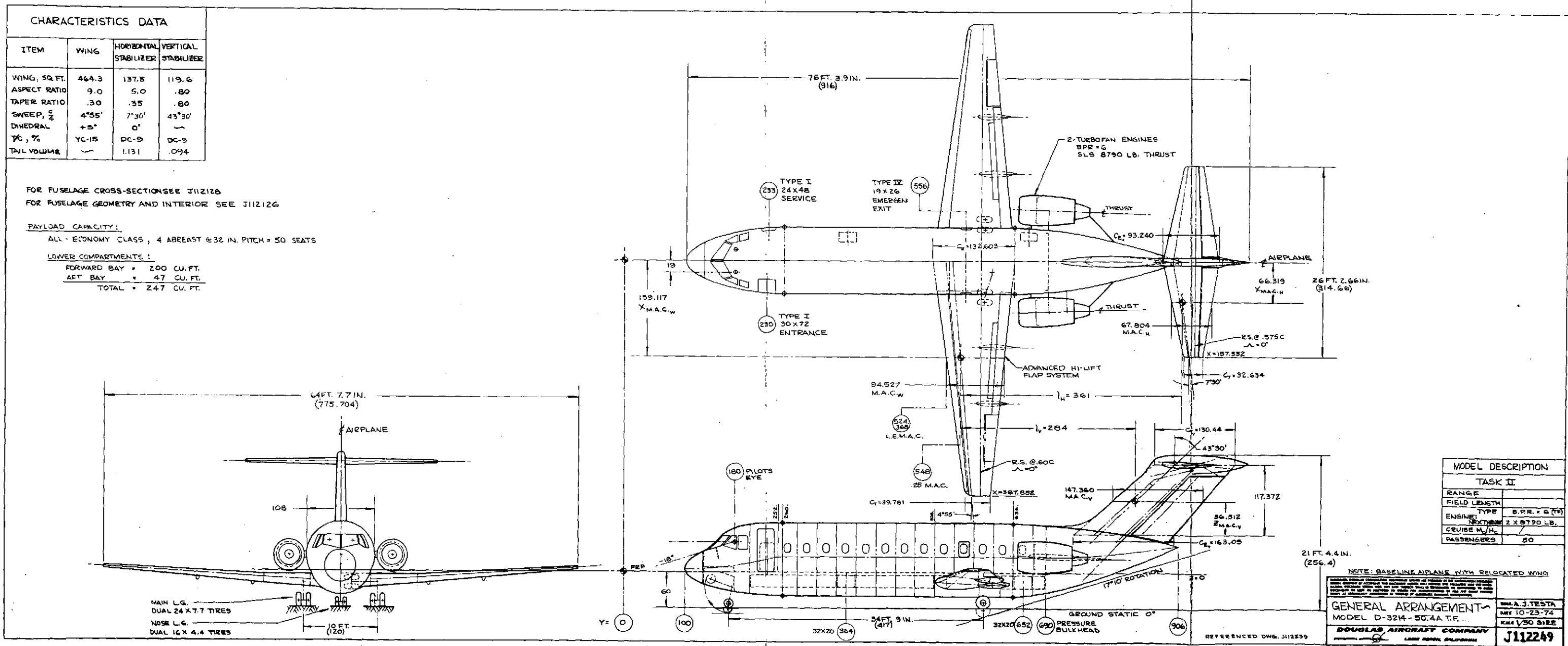


FIGURE A-39

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CHARACTERISTICS DATA			
ITEM	WING	HORIZONTAL STABILIZER	VERTICAL STABILIZER
WING, SQ.FT.	464.3	137.5	119.6
ASPECT RATIO	9.0	5.0	.80
TAPER RATIO	.30	.35	.80
SWEEP, $\frac{C}{4}$	4°55'	7°30'	43°30'
DIHEDRAL	+5°	0°	~
γ_c, γ_e	YC-15	DC-9	DC-9
TAIL VOLUME	~	1.592	.1156

FOR FUSELAGE CROSS-SECTION SEE J112126
 FOR FUSELAGE GEOMETRY AND INTERIOR SEE J112127

PAYLOAD CAPACITY:
 ALL-ECONOMY CLASS, 4 ABREAST @ 32 IN. PITCH = 70 SEATS

LOWER COMPARTMENTS:
 FORWARD BAY = 264 CU.FT.
 AFT BAY = 91 CU.FT.
 TOTAL = 355 CU.FT.

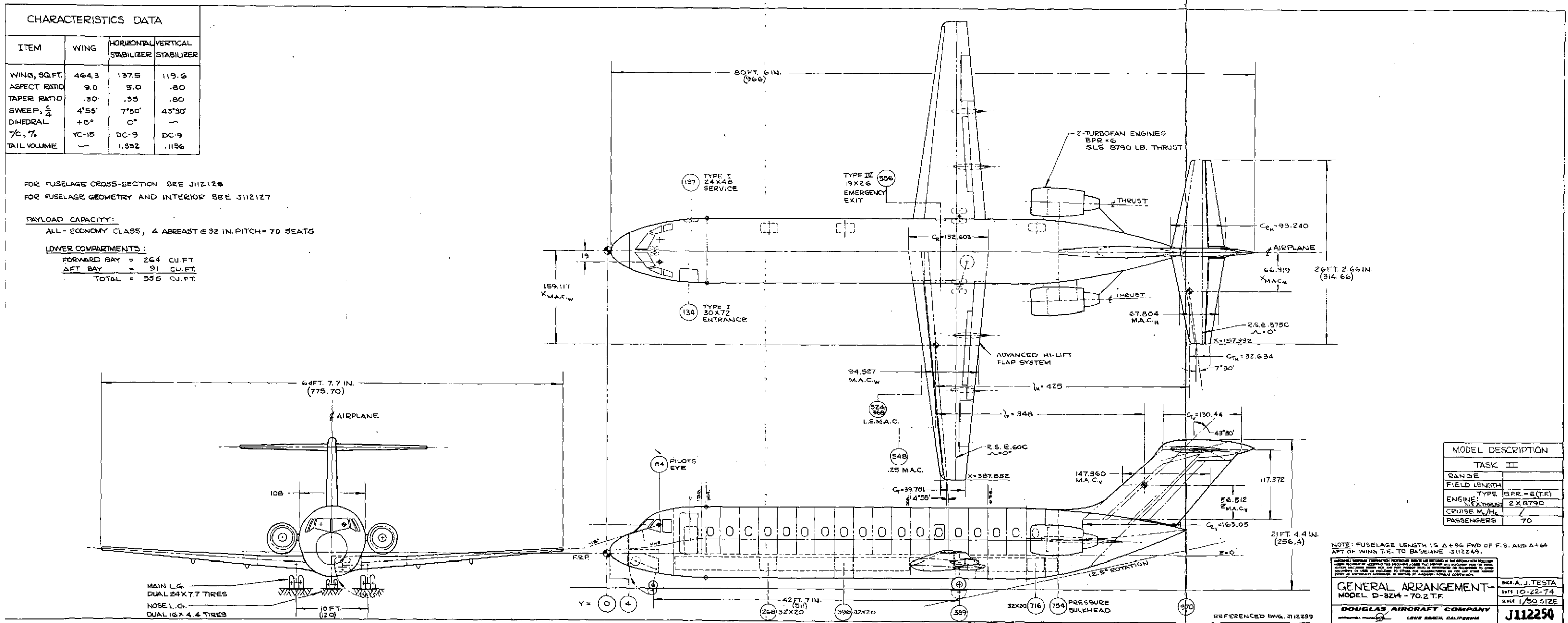


FIGURE A-40

A-57

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42 SEATS

SHRINK
FUSELAGE
Δ-64 FWD
STA. 508

SHRINK

MODEL D-3214-42.1

906 = 61 FT. 9.9 IN. FUSELAGE LENGTH

50 SEATS

4 ABREAST @ 32 IN. PITCH (TYP)

BASELINE

MODEL D-3214-50.4

906 = 67 FT. 1.9 IN. FUSELAGE LENGTH

70 SEATS

STRETCH

MODEL D-3214-70.2

970 = 80 FT. 6.0 IN. FUSELAGE LENGTH

TASK II

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FUSELAGE SHRINK/STRETCH STUDY
MODELS D-3214-(NOTED)

DOUGLAS AIRCRAFT COMPANY
LONG BEACH, CALIFORNIA

ENGR. A. J. TESTA

DATE 9-19-74

SCALE 1/50 SIZE

J112239

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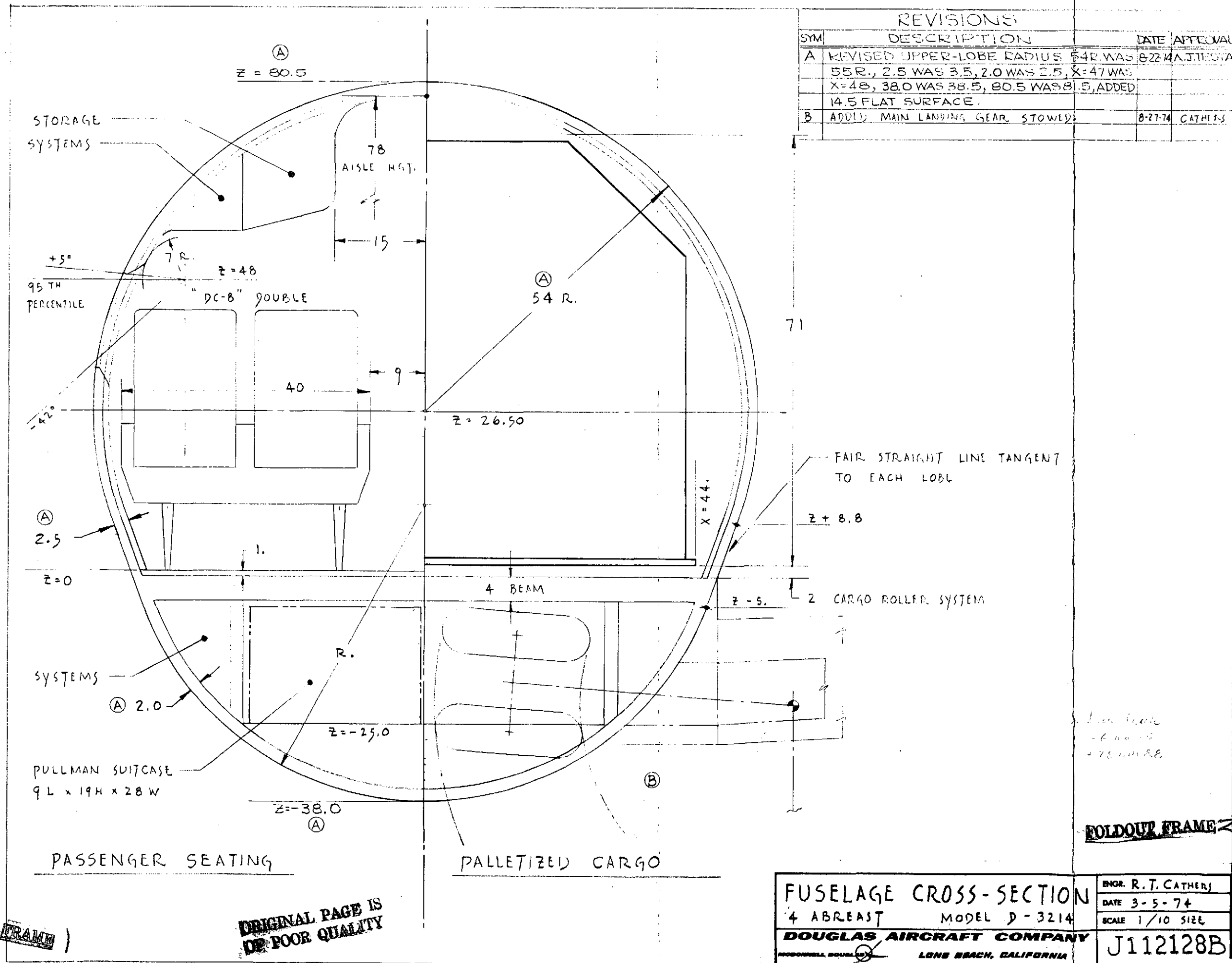
3

FIGURE A-41

A-58

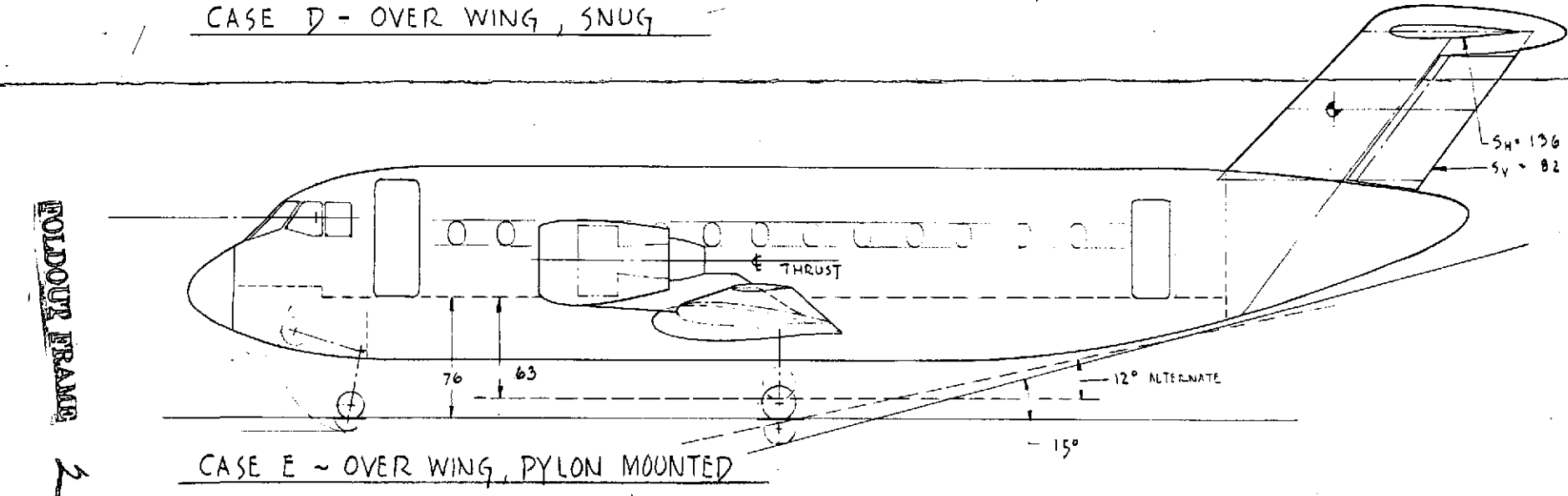
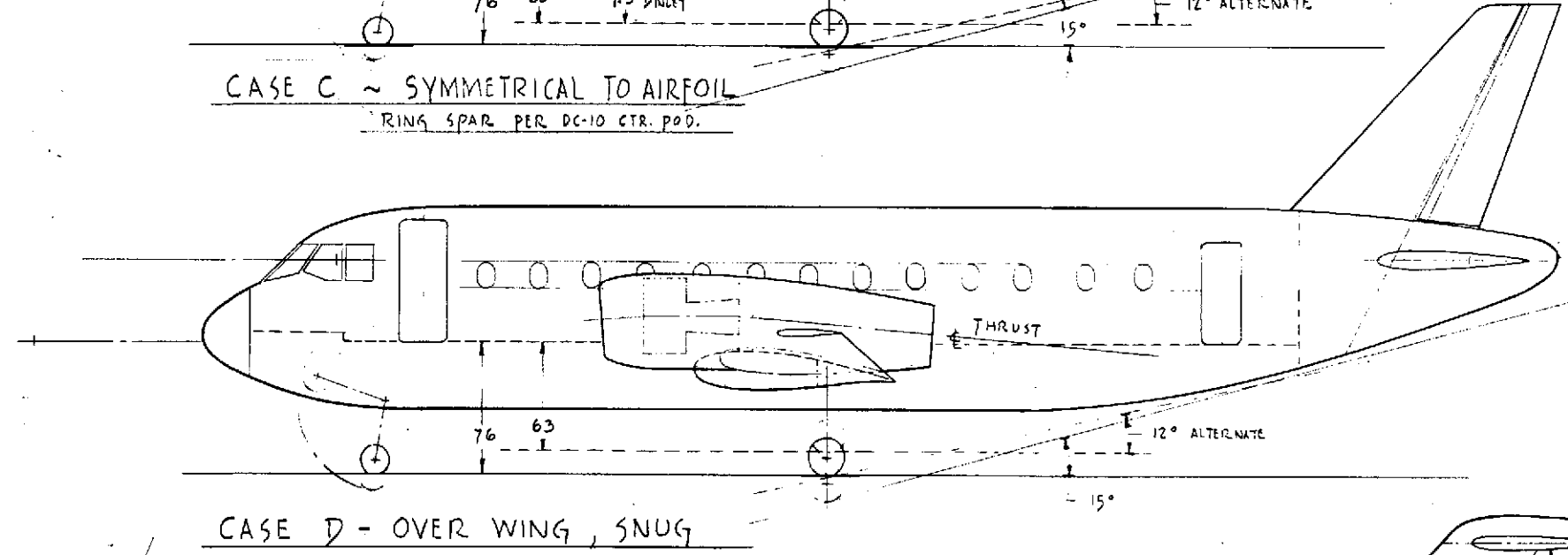
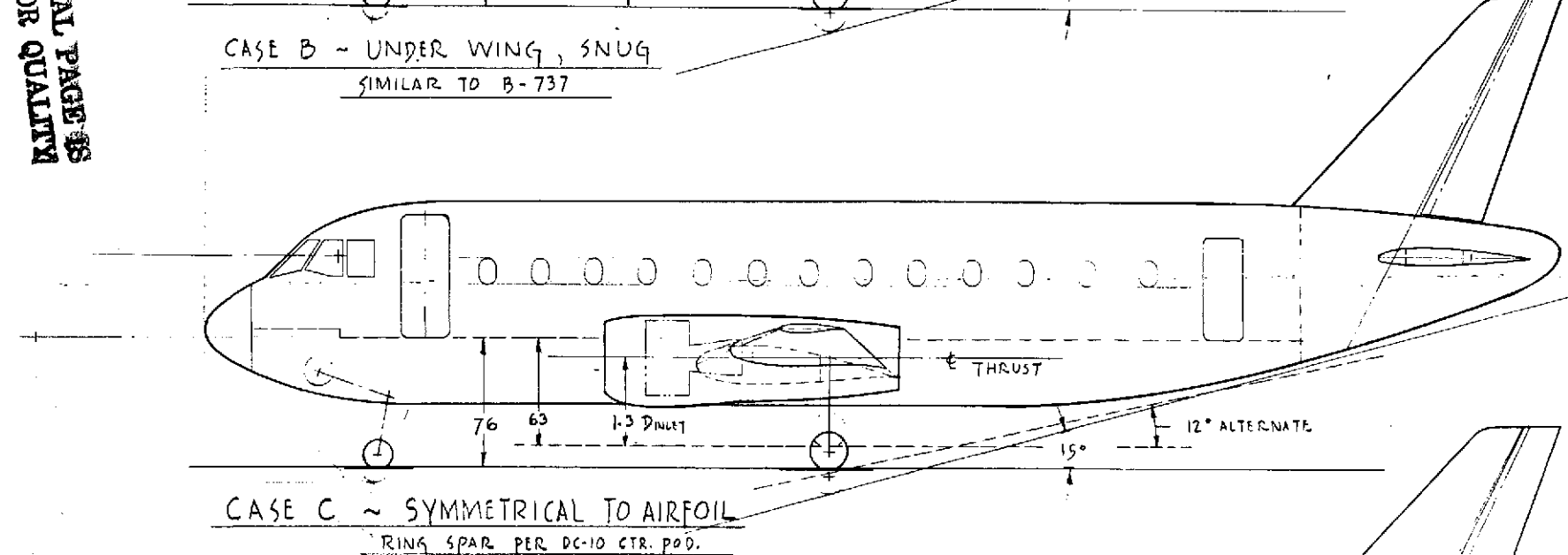
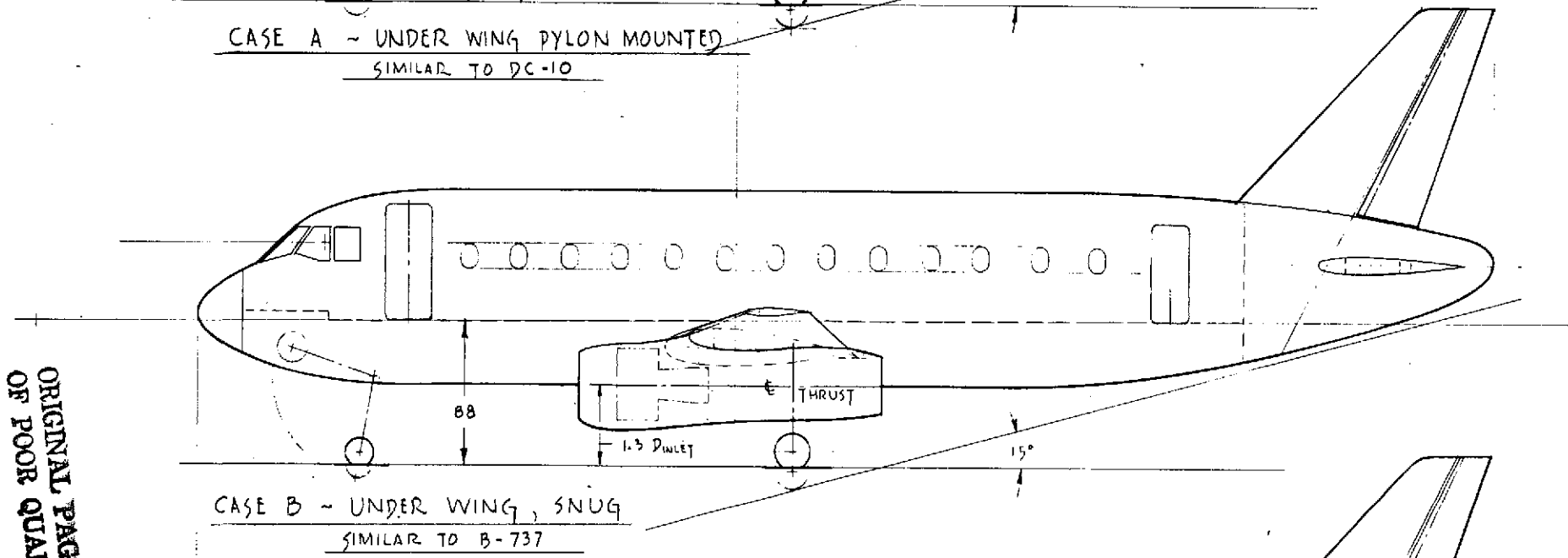
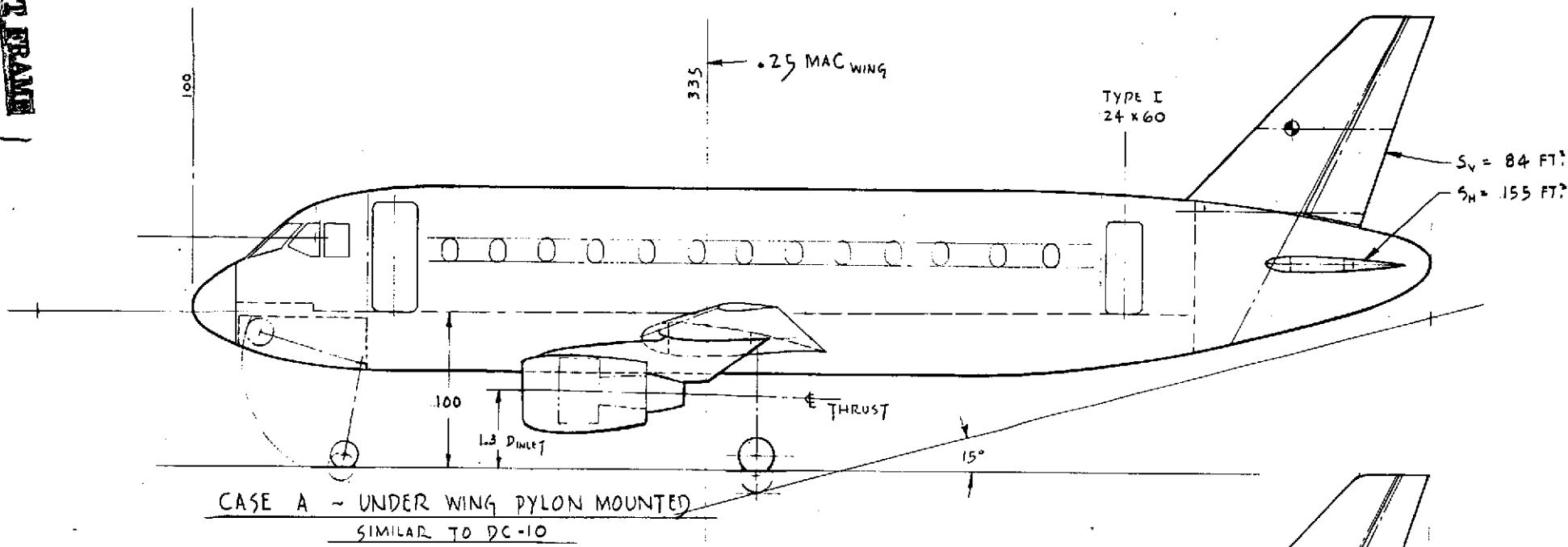
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FUSELAGE CROSS-SECTION		ENGR. R. T. CATHERY
4 ABREAST		DATE 3-5-74
MODEL D-3214		SCALE 1/10 SIZE
DOUGLAS AIRCRAFT COMPANY		J112128B
LONG BEACH, CALIFORNIA		

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NOTE :

1. ALL ENGINES LOCATED TO DROP VERTICALLY CLEARING THE WING BOX FRONT SPAR.
2. SEE J112133A FOR BASIC CONFIGURATION. ($S_w = 497 \text{ FT}^2$)
3. EMPENNAGE SIZE SHOWN TENTATIVE ONLY.
4. ENGINE LOCATION @ $X=140$.

FORWARD ENGINE ARRANGEMENTS		ENGR. R.T. CATHERS
MODEL D-3214-50 STUDY		DATE 4-12-74
DOUGLAS AIRCRAFT COMPANY		SCALE 1/50 SIZE
LONG BEACH, CALIFORNIA		J112139

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FIGURE A-44

A-67

A.5 PROPELLER DESIGN AND SELECTION

This section describes the Douglas procedure used in the design and selection of the propeller. Conventional propeller formulae (Section A.5.1) are not suitable for use in integrating engine-propeller and airframe characteristics, in order to study a propeller family designed for a given set of takeoff and cruise requirements, and finally select the best engine-propeller combination.

Accordingly, unconventional propeller formulae (Section A.5.2) were developed, along with engine-propeller characteristics relating takeoff and flight thrust (Section A.5.3). In turn, these formulae were combined with the airframe cruise condition characteristics, thus interrelating the engine-propeller and airframe takeoff and flight requirements (Section A.5.4).

Equations #2, 3 and 4 (Section A.5.2) define the engine-propeller family; equations #8, 9 and 10 (Section A.5.4) relate these characteristics to the takeoff thrust-and power-to-weight ratios for takeoff and cruise.

Tables A-10, A-11 and A-12 show the data for a typical solution. Table A-10 shows two cruise conditions for a turboprop aircraft, derived from a turbofan configuration, assuming no change in gross weight or drag. Table A-11 shows the equations necessary for an engine-propeller family study, satisfying the requirements for a 4500 foot field length and a cruise condition of 0.60 Mach at 20,000 foot altitude. Table A-12 tabulates the results.

A.5.1 Conventional Propeller Formulae

Power Coefficient: $C_P = \frac{(SHP) (\rho_{SL}/\rho)}{2000(N/1000)^3 (D/10)^5}$

Thrust Coefficient: $C_T = \frac{F (\rho_{SL}/\rho)}{6600(N/1000)^2 (D/10)^4}$

Advance Ratio: $J = 60 V_C/ND$

Efficiency: $\eta = J (C_T/C_P)$

Thrust: Takeoff, at $J \leq 0.8$, using design charts of (C_T/C_P) vs C_P

$$F = (C_T/C_P) \frac{33000(SHP)}{ND}$$

Thrust: Flight, at $J \geq 0.8$, using design charts of C_P vs. J with η as parameter

$$F = \eta (SHP)(550/V_C)$$

Where:

SHP = Shaft horsepower

ρ = Atmospheric density (slugs/ft³)

N = Revolutions per minute

D = Propeller diameter (ft)

F = Thrust (lb)

V_C = Velocity, cruise (fps)

SL = Subscript; sea level, standard day

A.5.2 Unconventional Propeller Formulae

In order to relate takeoff and flight performance, the formulae above are expressed in a different form, as follows:

$$\text{Propeller Disc Area: } S_{\pi} = (\pi/4) D^2$$

$$\text{Propeller Tip Speed: } V_T = (\pi/60) ND \\ \text{(static, fps)}$$

$$\text{Advance Ratio: } J = \pi (V_C/V_T) = \pi (C_S M_C/V_T) \quad (1)$$

$$\text{Disc Load, Thrust: } \frac{F}{S_{\pi}} = 1289.6 \rho (V_T/100)^2 (C_T/C_P) C_P, \text{ at } J \leq 0.8 \quad (2) \\ = 1289.6 \rho (V_T/100)^2 (\eta/J) C_P, \text{ at } J \geq 0.8$$

$$\text{Disc Load, Power: } \frac{SHP}{S_{\pi}} = 74.63 (V_T/100)^3 C_P \quad (3)$$

$$\text{Thrust/Power Ratio: } \frac{F}{SHP} = \frac{1727.9}{V_T} (C_T/C_P), \text{ at } J \leq 0.8 \quad (4) \\ = \frac{1727.9}{V_T} \frac{\eta}{J}, \text{ at } J \geq 0.8$$

$$\text{Where: } C_S = \text{Speed of sound (fps)}$$

$$M_C = \text{Mach number}$$

A.5.3 Takeoff and Flight Relationship: Engine-Propeller

The unconventional formulae above are used to relate propeller performance in flight with that at static takeoff condition:

Atmospheric Density Ratio: $\sigma = \rho/\rho_R$

Horsepower Ratio: $K_P = (\text{SHP})_C / (\text{SHP})_{RO} = \sigma C_{P_C} / C_{P_{RO}} \quad (5)$

Thrust (Cruise/Takeoff): $\frac{F_C}{F_{RO}} = \frac{K_P (\eta_C/J_C)}{(C_T/C_P)_{RO}} \quad (6)$

Where: R = Subscript: reference altitude for takeoff, usually sea level standard or 90°F day

O = Subscript: Static condition

A.5.4 Takeoff and Flight Relationship: Engine-Propeller and Airframe

$$\text{Excess Cruise Thrust: } (nF_C - D_C)(V_C/W_C) = 5 \text{ fps}$$

Relating the standard requirement above with the airframe characteristics, we obtain:

$$\text{Cruise Thrust/Weight: } \frac{nF_C}{W_G} = \left[\frac{1}{(L/D)_C} + \frac{5}{C_S M_C} \right] \frac{W_C}{W_G} \quad (7)$$

Using formulae #1 through #7 above, we obtain:

$$\frac{nF_{RO}}{W_G} = \frac{(C_T/C_P)_{RO}}{K_P (\eta/J)_C} \left[\frac{1}{(L/D)_C} + \frac{5}{C_S M_C} \right] \frac{W_C}{W_G} \quad (8)$$

$$\frac{n(\text{SHP})_{RO}}{W_G} = \frac{(V_T/1727.9)}{K_P (\eta/J)_C} \left[\frac{1}{(L/D)_C} + \frac{5}{C_S M_C} \right] \frac{W_C}{W_G} \quad (9)$$

$$\frac{nS_\pi}{W_G} = \frac{7.7545}{V_T^2 \rho_R C_{RO}} \cdot \frac{1}{K_P (\eta/J)_C} \left[\frac{1}{(L/D)_C} + \frac{5}{C_S M_C} \right] \frac{W_C}{W_G} \quad (10)$$

Where: n = Number of engine-propeller power plants
 D_C = Cruise drag (lb)
 W_C = Cruise weight (lb)
 $(L/D)_C$ = Cruise lift/drag ratio
 W_G = Gross or takeoff weight (lb)

A.5.5 Procedure for Propeller Selection

The procedure for solution is as follows:

1. Select several values of $C_{P_{RO}}$ and determine the corresponding values of $(C_T/C_P)_{RO}$ from the propeller take-off charts.
2. Using several values of V_T , compute F_{RO}/S_π , SHP_{RO}/S_π and $(F/SHP)_{RO}$.
3. Compute K_p , i.e., unitize the performance of a selected turboshaft engine family.
4. Compute nF_C/W_G for one or more cruise conditions, using airplane drag values and the minimum (or other) power margin.
5. At the design cruise conditions, compute C_{P_c} for each value of $C_{P_{RO}}$ and also J_c for each value of V_T .
6. Using the propeller cruise charts determine η_c at the design cruise conditions, for each combination of C_{P_c} and V_T .
7. Finally, compute nF_{RO}/W_G , $nSHP_{RO}/W_G$ and nS_π/W_G .

TABLE A-10

PROPELLER SELECTION

AIRPLANE		TURBOFAN	TURBOPROP	
CRUISE: ALT:	(FT)	23,000	20,000	20,000
M_C		0.685	0.60	0.50
S_W	(SQ.FT)	497	500	500
W/S_W	(LB/SQ.FT)	88.3	87.8	87.8
$f = C_{D_0} S_W$	(SQ.FT)	13.19	13.19	13.19
C_{D_0}		0.0265	0.0264	0.0264
q_C	(LB/SQ.FT)	283	246	171
C_L		0.3025	0.3460	0.4985
ΔC_{D_i}		0.0041	0.0053	0.0111
$5/C_S M_C$			0.0080	0.0096
$n F_C / W_G$			0.0966	0.0822
V_C	(FPS)		622	518
V_T	(FPS)		700	700
J_C			2.79	2.33
K_P			0.652	0.614

TABLE A-11

PROPELLER DESIGN PARAMETERS

$$\frac{nF_{R0}}{W_G} = (C_T/C_P)_{R0} \times \frac{2.79 \times 0.0966}{0.652 \eta_C} = 0.4134 \frac{(C_T/C_P)_{R0}}{\eta_C} = 0.3634 \text{ (required, 4500 ft. field)} \quad (8)$$

$$\frac{nSHP_{R0}}{W_G} = \frac{700}{1728} \times \frac{2.79 \times 0.0966}{0.652 \eta_C} = \frac{0.1675}{\eta_C} \quad (9)$$

$$\frac{nS_\pi}{W_G} = \frac{7.755}{(700)^2 C_{P_{R0}} \rho_R} \times \frac{2.79 \times 0.0966}{0.652 \eta_C} = \frac{0.00275}{\eta_C C_{P0}} \quad (10)$$

$$F_{R0} S_\pi = 150.2 C_{T_{R0}} \quad (2)$$

$$SHP_{R0}/S_\pi = 60.9 C_{P_{R0}} \quad (3)$$

$$(F/SHP)_{R0} = 2.47 (C_T/C_P)_{R0} \quad (4)$$

TABLE A-12
PROPELLER FAMILY CHARACTERISTICS

B x A.F.	3 x 80	4 x 80	4 x 100	4 x 140	4 x 180	4 x 220	
V_T	700	700	700	700	700	700	
C_{LI}	0.15	0.15	0.15	0.15	0.15	0.15	
$(C_T/C_P)_0$	0.795	0.793	0.785	0.775	0.762	0.750	
C_{P_0}	0.185	0.243	0.298	0.393	0.459	0.525	
C_{T_0}	0.147	0.193	0.234	0.305	0.357	0.394	
η_C	0.904	0.901	0.893	0.880	0.865	0.853	
nF_{RO}/W_G	0.3634	0.3634	0.3634	0.3634	0.3634	0.3645	(8)
$nSHP_{RO}/W_G$	0.1854	0.1860	0.1878	0.1903	0.1937	0.1965	(9)
nS_π/W_G	0.01647	0.01257	0.01037	0.00796	0.00678	0.00615	(10)
F_{RO}/S_π	22.1	28.9	35.1	45.6	53.5	59.1	(2)
SHP_{RO}/S_π	11.28	14.78	18.2	23.9	28.5	31.9	(3)
$(F/SHP)_{RO}$	1.958	1.952	1.933	1.907	1.877	1.850	(4)
nF_{RO}	2 x 7975	2 x 7975	2 x 7975	2 x 7975	2 x 7975	2 x 7975	
$nSHP_{RO}$	2 x 4075	2 x 4080	2 x 4125	2 x 4180	2 x 4250	2 x 4310	
nS_π	2 x 361.5	2 x 276	2 x 227	2 x 175	2 x 149	2 x 135	
D	21.45	18.75	17.00	14.94	13.78	13.10	
N	623	713	785	895	970	1020	

A-70

A.6 ACOUSTICS

Tables A-13 to A-22 inclusive illustrate, in a very abbreviated form, various computer print-outs of three computer programs: B5BA, Generalized Engine Cycle Procedure; SNAP, Douglas Source Noise Analysis Procedure; and AIFA, Aircraft Contour/Community Noise Impact Evaluation Program.

Table A-13 contains a sample computer print-out of the B5BA computer program used in the parametric aircraft studies. The data shown are for the 50 passenger, 4500 foot (1371.6 m) field length, 2 x 250 nautical mile (463 km) stage length, nominal flap, fixed-pitch turbofan aircraft.

Table A-14 contains a sample computer print-out of the Douglas SNAP computer program used for estimating the flyover noise levels of the final design basepoint aircraft. The data shown are for the approach case of the 50 passenger, 850 nautical mile (1574.2 km) range, advanced flap, fixed-pitch turbofan aircraft. The hardwall treatment lines indicate the noise levels without any acoustic treatment. The minimum treatment lines indicate the noise levels obtained employing the cowl wall acoustic treatment shown in Figure 8-5, Volume II. The maximum treatment lines indicate the noise levels obtained when the engine components are treated to the jet/core noise floor. The effect of non-propulsive noise is not included in estimated levels.

Tables A-15 through A-22 contain a sample computer print-out of the AIFA Computer program for the final design basepoint aircraft, and the typical operational takeoff and landing procedure. Chicago Midway Airport was used for the noise impact analysis.

TABLE A-13

MEDIUM DENSITY AIR TRANSPORTATION (TURBOFAN)

ACOUSTICS ANALYSIS

AIRCRAFT TAKEOFF GROSS WEIGHT = 43920	FIELD LENGTH = 4500
ENGINE BYPASS RATIO = 6.0	ENGINE SCALING FACTOR = 0.20
ENGINE TREATMENT CONFIGURATION = HARDWALL	NUMBER OF ENGINES = 2
NUMBER OF PASSENGERS = 50	WING AREA (SW) = 497
STAGE LENGTH = 250	DESIGN THRUST (FNDES) = 7980

A-72

	TAKEOFF	APPROACH	SIDELINE
FAR PART 36 REQUIREMENTS (-10 dB)	83.0	92.0	92.0
ALTITUDE (FEET)	2970	370	1672 (SLANT RANGE)
THRUST (PERCENT)	0.70	0.40	1.00
AIRPLANE VELOCITY (KNOTS TAS)	146.0	134.0	146.0
FAR PART 36 ESTIMATED EPNL	78.2	98.3	87.1

TABLE A-14

MEDIUM DENSITY TASK II BASEPOINT, MIXED FLOW, (W/APPROACH DCF)

DESIGN CASE 1. MEDIUM DENSITY BASEPOINT MOD D3214-50.4, APPROACH (2 ENG. 370 ALT. FN 2283 LBS)

ENGINE THRUST = 2283. ENGINE RPM = 5397.60

A-73

TREATMENT	DISTANCE	FAN INLET	FAN EXHAUST	TURBINE	JET	CORE	AFT PNL	INLET PNL	D.C.	EPNL
Hardwall	200.	110.13	108.70	102.11	70.89	94.99	110.27	110.28	-8.00	102.28
Minimum	200.	104.01	99.90	99.47	70.89	94.99	103.97	104.25	-8.00	96.25
Maximum	200.	100.54	95.77	96.18	70.89	94.99	100.97	100.96	-8.00	92.97
Hardwall	370.	103.34	101.91	94.91	64.86	88.96	103.45	103.50	-5.50	98.00
Minimum	370.	97.22	93.11	92.27	64.86	88.96	97.15	97.49	-5.50	91.99
Maximum	370.	93.75	88.98	88.98	64.86	88.96	94.26	94.24	-5.50	88.76
Hardwall	1000.	89.28	87.84	79.84	54.18	78.29	89.44	89.48	-1.30	88.18
Minimum	1000.	83.16	79.04	77.20	54.18	78.29	83.55	83.64	-1.30	82.34
Maximum	1000.	79.68	74.91	73.90	54.18	78.29	81.30	80.63	-1.30	80.00
Hardwall	4000.	63.27	61.84	48.16	37.38	61.49	65.15	64.18	3.20	68.35
Minimum	4000.	57.15	53.04	45.52	37.38	61.49	62.34	59.88	3.20	65.54
Maximum	4000.	53.68	48.91	42.23	37.38	61.49	61.87	58.34	3.20	65.07
Hardwall	10000.	42.00	40.57	17.90	25.05	49.16	49.83	46.27	4.40	54.23
Minimum	10000.	35.88	31.77	15.26	25.05	49.16	49.28	44.78	4.40	53.68
Maximum	10000.	32.41	27.64	11.97	25.05	49.16	49.22	44.46	4.40	53.62

TABLE A- 15

ENGINE NOISE DATA, EPNDB

		THRUST				
		2000.0	3000.0	4000.0	5000.0	6000.0
S L A N T	500.	88.0	91.5	94.2	96.5	98.5
	1000.	80.5	84.5	88.0	90.5	92.2
	2000.	71.5	76.5	80.5	83.0	85.5
	3000.	65.7	71.2	75.3	78.2	80.6
	4000.	61.3	67.3	71.5	74.5	77.0
R A N G E						
REF VEL		135.0	135.0	165.0	165.0	165.0

TABLE A- 16
TAKEOFF PARAMETERS

DISTANCE FBR ALONG FL PATH	DIST. FBR ALONG RUNWAY CENTERLINE	ALTITUDE	DISTANCE FROM RUNWAY CENTERLINE	AIRCRAFT VELOCITY	THRUST	FLAP ANGLE	EXHAUST VELOCITY	EXHAUST TEMP.
0.0	0.0	0.0	0.0	0.0	8039.0	0.0	0.0	0.0
2744.2	2744.2	0.0	0.0	127.0	6289.0	0.0	0.0	0.0
3435.2	3435.2	35.0	0.0	133.3	6218.5	0.0	0.0	0.0
6066.6	6066.6	362.9	0.0	142.3	6149.4	0.0	0.0	0.0
8361.8	8361.8	592.0	0.0	157.1	6007.0	0.0	0.0	0.0
10921.1	10921.1	950.8	0.0	161.9	5988.3	0.0	0.0	0.0
13879.9	13879.9	1485.3	0.0	162.0	6040.0	0.0	0.0	0.0
14202.1	14202.1	1542.1	0.0	161.5	4086.5	0.0	0.0	0.0
16626.9	16626.9	1796.1	0.0	160.5	4116.1	0.0	0.0	0.0
19054.7	19054.7	2015.2	0.0	160.5	4131.7	0.0	0.0	0.0
21535.8	21535.8	2236.8	0.0	160.5	4147.5	0.0	0.0	0.0
24773.8	24773.8	2522.2	0.0	160.5	4168.4	0.0	0.0	0.0

TABLE A-17
APPROACH PARAMETERS

DISTANCE TT ALONG FL PATH	DISTANCE TT ALONG RUNWAY CENTERLINE	ALTITUDE	DISTANCE FROM RUNWAY CENTERLINE	AIRCRAFT VELOCITY	THRUST	FLAP ANGLE	EXHAUST VELOCITY	EXHAUST TEMP.
0.0	0.0	50.0	0.0	123.5	1902.0	0.0	0.0	0.0
693.0	693.0	100.0	0.0	123.7	1907.0	0.0	0.0	0.0
2083.0	2083.0	200.0	0.0	123.9	1916.0	0.0	0.0	0.0
3475.0	3475.0	300.0	0.0	124.0	1925.0	0.0	0.0	0.0
4868.0	4868.0	400.0	0.0	124.2	1935.0	0.0	0.0	0.0
6263.0	6263.0	500.0	0.0	124.4	1944.0	0.0	0.0	0.0
7660.0	7660.0	600.0	0.0	124.6	1953.0	0.0	0.0	0.0
9060.0	9060.0	700.0	0.0	124.8	1963.0	0.0	0.0	0.0
10462.0	10462.0	800.0	0.0	125.0	1973.0	0.0	0.0	0.0
11866.0	11866.0	900.0	0.0	125.1	1982.0	0.0	0.0	0.0
13271.0	13271.0	1000.0	0.0	125.3	1992.0	0.0	0.0	0.0
16080.0	16080.0	1200.0	0.0	125.3	2011.0	0.0	0.0	0.0

TABLE A-18

EPNL GRID - TAKEOFF

(DISTANCE FROM FLIGHT PATH CENTERLINE, FT)

DISTANCE F.B.R. TYPE NOISE	0 5000	500 5500	1000 6000	1500 6500	2000 7000	2500 7600	3000 8000
0. Engine Noise	114.5	101.3	92.2	87.7	84.6	81.3	78.6
1000. Engine Noise	110.0	97.2	88.3	83.4	79.8		
4500. Engine Noise	103.8	97.0	88.9	83.7	80.0		
7000. Engine Noise	99.6	95.8	90.2	85.1	81.2	77.9	
9500 Engine Noise	95.6	93.4	89.6	85.2	81.2	77.8	
12500 Engine Noise	90.4	89.5	87.6	85.3	82.9	79.6	
14000 Engine Noise	88.6	88.0	86.5	84.5	82.3	80.3	77.5
17500 Engine Noise	81.7	81.2	80.0	78.3			
19500 Engine Noise	80.7	80.2	79.1				
21000							

TABLE A- 19
 EPNL GRID - APPROACH
 (DISTANCE FROM FLIGHT PATH CENTERLINE, FT)

DISTANCE T.T. TYPE NOISE	0 5000	500 5500	1000 6000	1500 6500
0. Engine Noise	94.8	83.9	73.7	
1000. Engine Noise	93.8	84.8	75.0	
2000. Engine Noise	92.7	85.3	75.7	
4500. Engine Noise	90.0	85.0	76.8	
7000. Engine Noise	87.1	83.4	77.9	
9500 Engine Noise	84.1	81.8	77.2	
12000 Engine Noise	81.8	80.1	76.3	
14500 Engine Noise	79.8	78.4		

TABLE A-20

80.0 EPNdB NOISE CONTOUR POINTS - TAKEOFF
(ALL DISTANCE IN FEET)

DISTANCE FBR ALONG FL PATH	DISTANCE FROM FL PATH CENTERLINE	COORDINATE POINTS	COORDINATE POINTS
0.	2743.	(0., 2743.)	(0., -2743.)
1000.	1978.	(500., 2321.)	(500., -2321.)
3000.	1667.	(3000., 1667.)	(3000., -1667.)
5500.	2090.	(5500., 2090.)	(5500., -2090.)
8500.	2161.	(8500., 2161.)	(8500., -2161.)
12000.	2405.	(12000., 2405.)	(12000., -2405.)
16000.	1181.	(16000., 1181.)	(16000., -1181.)
20767.	0.	(20767., 0.)	(20767., 0.)

AREA WITHIN TAKEOFF CONTOUR = 2.61 SQUARE MILES
6.76 SQUARE KILOMETERS

TABLE A-21

80.0 EPNDB NOISE CONTOUR POINTS - APPROACH

(ALL DISTANCE IN FEET)

DISTANCE TT ALONG FL PATH	DISTANCE FROM FL PATH CENTERLINE	COORDINATE POINTS	COORDINATE POINTS
0.	2743.	(0., 2743.)	(0., -2743.)
500.	2648.	(500., 2648.)	(500., -2648.)
1500.	1170.	(1500., 1170.)	(1500., -1170.)
3000.	799.	(3000., 799.)	(3000., -799.)
5000.	807.	(5000., 807.)	(5000., -807.)
7500.	795.	(7500., 795.)	(7500., -795.)
10000.	664.	(10000., 664.)	(10000., -664.)
12000.	514.	(12000., 514.)	(12000., -514.)
14221.	0.	(14221., 0.)	(14221., 0.)

AREA WITHIN APPROACH CONTOUR = 0.86 SQUARE MILES
2.23 SQUARE KILOMETERS

TOTAL AREA WITHIN CONTOUR = 3.47 SQUARE MILES
8.99 SQUARE KILOMETERS

TABLE A-22

COMMUNITY NOISE IMPACT

AIRPORT -- MDW-MIDWAY (CHICAGO)

RUNWAY -- 22L

RUNWAY COORDINATES -- (2050., 1800) FEET RELATIVE TO AIRPORT REFERENCE POINT

RUNWAY ANGLE -- 228.0 DEGREES MEASURED COUNTERCLOCKWISE FROM EAST-WEST LINE

COORDS REL TO AIRPORT REF PT.	COORDS REL TO RUNWAY BR PT.	POPULATION	EPNL	ANNOYANCE FACTOR	NOISE IMPACT
(-11500., -13500.)	(20437., 168.)	66.4	80.0	0.001	0.05
(- 8000., -11000.)	(16237., 1096.)	0.0	80.2	0.004	0.0
(- 8000., - 6000.)	(12521., -2249.)	0.0	81.3	0.025	0.0
(- 5000., - 9500.)	(13115., 2322.)	0.0	81.0	0.020	0.0
(- 5000., - 3000.)	(8284., -2027.)	137.5	81.0	0.019	2.64
(- 2000., - 5500.)	(8135., 1875.)	0.0	82.2	0.043	0.0
(- 2000., 0.)	(4048., -1805.)	0.0	80.9	0.018	0.0
(0., - 3500.)	(5310., 2028.)	125.4	80.3	0.007	0.86
(0., 0.)	(2709., - 319.)	0.0	99.0	0.380	0.0
(0., 3000.)	(480., -2326.)	117.3	80.1	0.001	0.15
(500., - 2500.)	(4233., 1725.)	0.0	81.7	0.034	0.0
(500., 3000.)	(145., -1955.)	44.7	84.2	0.083	3.72
(2000., - 500.)	(1743., 1502.)	0.0	81.6	0.032	0.0
(2000., 2500.)	(- 487., - 506.)	0.0	84.4	0.087	0.0
(5000., 4000.)	(-3609., 720.)	83.0	81.5	0.031	2.56
(5000., 6000.)	(-5095., - 618.)	127.1	82.9	0.058	7.33
(8000., 7500.)	(-6217., 608.)	127.1	81.5	0.031	3.92
(8000., 9000.)	(-9332., - 396.)	22.0	82.4	0.047	1.04
(11000., 12000.)	(-13569., - 174.)	63.4	80.0	0.000	0.02

TOTAL POPULATION AFFECTED = 11613.1

TOTAL NOISE IMPACT = 1485.16

APPENDIX B - OPERATIONS

B.1 CITY PAIRS TRAFFIC DENSITY

Table B-1 contains the CAB data on origin and destination air travelers for 1972. The data is organized by range increments of 100 miles and traffic density per year. The density classes are equivalent to 20 to 49 travelers per day per route for the first class only. The remaining class increments are 50 passengers per day per route to a maximum limit of 500 per day. City pairs are coded with a three-letter designation. This data provided the background for the preliminary size screening in Section 12.1.

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNG PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 0- 99 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS DISTANCE UNITS TRAFFIC UNITS TRAFFIC-DISTANCE PRODUCT
MILES PASSENGER HS PASSENGER

AHN ATL	67	16,550	1,108,850
ATL CSG	83	14,630	1,214,290
ATL GAD	98	14,560	1,426,880
AVL CLT	92	7,830	720,360
BAL SBY	85	12,250	1,042,100
BDL BOS	91	10,390	945,490
BDL PVD	66	7,970	526,020
BPT IAH	78	17,730	1,382,940
BUP ROC	55	11,890	653,950
CHI JVL	83	10,910	905,530
CLE MFD	59	12,210	720,390
CVG DAY	63	9,990	629,370
CYS DEN	95	17,450	1,675,200
DAL IYR	78	15,830	1,234,740
DUJ PIT	84	9,710	815,640
HNL LNY	73	14,870	1,085,510
JST PIT	75	11,700	877,500
LAW OKC	72	10,180	743,140
LAX PMD	48	9,180	440,640
LAX WJF	48	9,180	440,640
LEX SDF	62	11,640	733,320
LNK OMA	55	10,860	597,300
MDT WAS	93	10,510	977,430
MEM MKL	71	7,380	523,980
MEM TUP	88	11,620	1,022,560
MGM PIT	61	13,240	807,640
MKE MKG	85	14,220	1,222,920
MKE MSN	74	11,150	825,100
MKE OSH	87	7,890	686,430
MKK OGG	46	9,380	440,860
MSP RST	76	13,310	1,011,560
NYC PHL	84	8,280	695,520
OWB SDF	83	11,290	948,360
PHL TTN	31	12,180	377,580
PIT YNG	57	13,670	779,190
STL UIN	94	12,140	1,141,160

TOTALS	36	423,780	31,380,090
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TABLE B.1

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 0- 99 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS		DISTANCE UNITS	TRAFFIC UNITS	TRAFFIC-DISTANCE PRODUCT
		MILES	PASSENGE	AS PASSENGER
ACT	DAL	88	32,190	2,961,480
AIY	PHL	47	27,750	1,304,250
BAL	WAS	36	19,320	714,840
BTR	MSY	65	22,200	1,443,000
CAX	PIT	70	22,600	1,582,000
CKB	PIT	83	20,660	1,714,780
COU	STL	99	23,140	2,290,860
CVG	SDF	83	28,150	2,336,450
DTT	FNT	53	29,670	1,572,510
LAX	PSP	97	25,530	2,476,410
MKC	TOP	56	18,570	1,039,920
MRY	SFO	86	32,480	2,825,760
TOTALS	12		302,260	22,262,260

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 0- 99 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT HS PASSENGER
ANB ATL	82	45,620	3,740,840
BEA CHI	71	46,630	3,310,730
CHI SBN	76	47,600	3,617,600
CHO WAS	84	37,970	3,189,480
GPI MSY	76	52,870	4,018,120
HNL MKK	54	46,710	2,522,340
SFO SMF	78	47,110	3,674,580
SPI STL	84	39,260	3,297,840
TOTALS	8	363,770	27,371,530

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.V6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 0- 99 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
COS	DEN	67	58,530	3,921,510
DTT	LAW	79	57,490	4,541,710
DTT	MBS	96	64,440	6,186,240
KOA	OGG	90	65,100	5,859,000
TOTALS		4	245,560	20,508,460

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 0- 99 TRAFFIC DENSITY: 91250- 109499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER HS	TRAFFIC-DISTANCE PRODUCT PASSENGER
CLE DTT	94	108,820	10,229,080
RIC WAS	96	93,690	8,994,240
TOTALS	2	202,510	19,223,320

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS DISTANCE UNITS TRAFFIC UNITS TRAFFIC-DISTANCE PRODUCT
MILES PASSENGER RS PASSENGER

ABQ FMN	148	11,560	1,710,880
ABQ ROW	163	13,970	2,277,110
ALB BTV	124	8,520	1,056,480
ALB ISP	139	15,740	2,203,600
ALB SYR	119	17,250	2,052,750
ALO MSP	166	10,970	1,821,020
ALS DEN	169	9,400	1,588,600
AUU PIT	102	10,970	1,118,940
APN DTT	192	11,530	2,213,760
ATL BHM	134	10,750	1,440,500
ATL CAE	192	16,940	3,252,480
ATL MGR	180	11,890	2,140,200
ATY MSP	193	8,400	1,621,200
BUR BOS	137	12,340	1,690,580
BFD PIT	123	11,910	1,464,930
BFF DEN	159	14,460	2,313,600
BFI PDX	132	16,420	2,167,440
BJI MSP	199	17,000	3,383,000
BMG CHI	198	9,600	1,900,800
BUI LWS	198	14,470	2,865,060
BDI PIH	189	7,450	1,408,050
BRD MSP	113	14,930	1,687,090
BRL STL	146	11,040	1,611,840
BTR MLU	146	9,310	1,359,260
BUF CLE	186	12,400	2,306,400
CGI STL	113	14,390	1,640,460
CHI CWI	132	9,430	1,244,760
CHI DNV	116	14,210	1,648,360
CHI GEG	153	11,440	1,750,320
CHI HUF	168	16,760	2,832,440
CHI JXN	172	10,270	1,766,440
CHI LAF	110	13,290	1,461,900
CHI LAN	174	14,470	2,517,780
CHI MIE	168	11,860	1,992,480
CHI MTW	177	11,970	2,118,690
CIC SFO	143	10,190	1,457,170
CKB WAS	163	15,000	2,445,000
CLT ILM	185	7,970	1,474,450
CLT ROU	130	16,900	2,197,000
CMH IND	182	11,720	2,133,040
COU MKC	129	12,070	1,605,310
CRP SAT	134	7,980	1,077,300

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT MS PASSENGER
CRW MSW	125	8,730	1,099,980
CRW PIT	163	8,410	1,370,830
CWA MSP	182	13,910	2,531,620
DAL GGG	115	14,550	1,673,250
DAN WAS	197	7,390	1,455,830
DEC STL	109	7,700	839,300
DEN GUC	140	10,140	1,419,600
DEN LAR	114	8,910	1,024,650
DEN MTJ	184	9,350	1,720,400
DSM MKC	174	10,870	1,891,380
DTT MKG	166	15,460	2,566,560
DTT YNG	149	9,540	1,421,460
ELM PHL	182	8,500	1,547,000
ESF MSY	155	14,890	2,307,950
EUG PDX	106	9,430	999,580
FLG PHX	119	13,640	1,623,160
FSD MSP	197	13,370	2,633,890
FSD OMA	162	7,760	1,264,880
GCN LAS	169	8,820	1,490,580
GRB MKE	107	12,960	1,386,720
GRI OMA	128	9,490	1,214,720
GRR MKE	120	17,130	2,055,600
GTR MEM	137	15,990	2,190,630
HPN SYR	187	9,460	1,769,020
HVN PHL	151	9,580	1,446,580
IAH LCH	126	10,220	1,287,720
IAH POE	152	8,390	1,275,280
IAH SAT	191	11,180	2,146,560
IAH VCT	117	7,310	862,580
IND SDF	111	11,100	1,232,100
IPL LAX	169	14,880	2,514,720
IPT NYC	158	11,560	1,826,480
IPT PHL	133	10,580	1,407,140
JAN MEM	189	16,130	3,048,570
JRW PIT	125	7,700	962,500
LAN MKE	168	11,130	1,869,840
LAS PSP	173	8,440	1,460,120
LUI SAT	148	11,610	1,718,280
LSE MSP	120	13,210	1,585,200
MEM MSL	136	7,850	1,067,600
MGW WAS	152	10,520	1,599,040
MKC SLN	166	11,180	1,855,880

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.V6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT HS PASSENGER
MSY POE	189	13,180	2,504,200
ORF RDU	159	7,690	1,230,400
OTH PDX	170	8,550	1,462,050
PDX SEA	132	16,420	2,167,440
PHX YUM	160	13,300	2,128,000
PIT PSB	120	8,740	1,048,800
SBY WAS	101	12,940	1,319,880
SLC IWF	175	17,870	3,127,250
TRI TYS	100	9,410	941,000
TTN WAS	161	9,090	1,463,490
TOTALS	94	1,095,300	166,075,560

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT AS PASSENGER
ALB ROC	198	27,730	5,490,540
ATL GSP	154	27,660	4,259,640
ATL MSL	197	24,150	4,781,700
ATL TCL	186	29,780	5,539,080
AVP NYC	100	30,540	3,054,000
BOL SYR	192	25,530	4,901,760
BFT PSC	173	24,600	4,255,800
BFI YKM	105	18,790	1,972,950
BMI CHI	114	18,970	2,162,580
BNA TYS	152	28,200	4,286,400
BUS HPN	165	26,500	4,394,000
BRL CHI	190	29,480	5,601,200
BUF SYR	134	26,540	3,556,360
CAK DTT	132	19,820	2,616,240
CHI DBQ	155	33,250	5,153,750
CHI MKG	119	25,620	3,048,780
CHI MLI	145	30,590	4,466,140
CLE CMH	117	26,510	3,101,670
CLE DAY	167	32,230	5,414,640
CLE PIT	104	26,180	2,748,900
CMH DTT	161	24,600	3,960,600
CMI STL	143	19,000	2,717,000
CRF IAH	193	28,680	5,563,920
CRW CVG	173	29,290	5,067,170
CVG HTS	123	36,380	4,474,740
DAL GRC	181	19,530	3,613,050
DAL TPL	120	25,670	3,208,750
DAL TXK	157	33,270	5,223,390
DAY DTT	175	21,450	3,753,750
DEN PUB	104	26,730	2,779,920
DTT PIT	198	21,090	4,175,820
DTT SBN	167	20,120	3,360,040
EVV IND	134	26,870	3,627,450
GLH MEM	123	20,300	2,496,900
HTL MSP	174	22,500	3,915,000
HOT MEM	182	24,630	4,482,660
HSV MEM	164	27,190	5,030,150
HTS PIT	192	27,990	5,374,080
IP1 PIT	181	22,590	4,088,790
JLN MKC	136	20,570	2,797,520
LAX SNA	195	22,740	3,320,040
LIT MEM	130	30,270	3,935,100

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
MHK MKC	112	35,360	3,960,320
MKC DMA	165	34,390	5,674,350
MKC SGF	145	31,370	4,580,020
MLT STL	186	29,630	5,629,700
MOB MSY	130	31,230	4,059,900
MWA STL	100	20,290	2,049,290
PAH SDF	183	19,680	3,601,440
PAH STL	145	21,950	3,182,750
PDX PSC	174	26,560	4,621,440
PDX YKM	120	22,360	2,683,200
PIT PKB	102	28,470	2,903,940
PSC SEA	173	24,600	4,255,800
PUK SDF	183	19,680	3,601,440
PUK STL	145	21,950	3,182,750
RDD SFO	189	24,990	4,723,110
RIC ROA	146	20,310	2,965,260
SEA YKM	105	18,790	1,972,950
SHD WAS	100	26,150	2,615,000
STL TBN	119	22,050	2,623,950

TOTALS	61	1,563,940	236,663,580
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ALB BOS	145	38,560	5,591,200
ACS IAH	147	37,350	5,490,450
AZO DTT	122	51,090	6,232,980
BUF PIT	186	36,970	6,876,420
CHI DEC	152	46,430	7,103,790
DAL LAW	149	50,170	7,926,860
SLM NYC	180	49,810	9,015,610
ENI PIT	109	47,860	5,216,740
ITH NYC	176	47,760	8,453,520
ITD OGG	121	50,250	6,080,250
LAS UNI	194	38,570	7,482,580
LCH MSY	178	39,460	7,023,880
LNK MKC	165	38,440	6,342,600
LTH WAS	152	39,200	5,958,400
MCO MIA	196	42,800	8,388,800
ORF WAS	149	37,140	5,533,860
PHX TUS	109	39,330	4,286,970
PIA STL	137	42,710	5,851,270
SGF STL	195	53,680	10,467,600

TOTALS	19	827,580	129,323,780
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ABI DAL	168	56,920	10,359,440
ATL DCA	171	72,310	12,365,010
BDL NYC	106	66,800	7,147,600
BGM NYC	145	66,760	9,680,200
BOS ISP	153	56,230	8,659,420
CMH PIT	143	57,360	8,259,840
DTT GRR	126	67,370	8,488,620
RNL MDE	171	56,730	9,700,830
LFT MSY	105	65,280	6,854,400
MDT NYC	154	62,550	9,632,700
NYC UCA	181	67,280	12,177,680

TOTALS	11	695,590	103,325,740
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 73000- 91249

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT AS PASSENGER
ABY	ATL	145	86,810	12,674,260
ATL	AVL	164	90,940	14,914,160
BDL	PHL	190	73,950	14,050,500
CHI	GRR	134	88,520	11,861,680
CHI	OSH	160	77,830	12,452,800
DAL	SPS	124	74,950	10,118,250
DLH	MSP	144	82,190	11,835,360
HUA	WAS	184	88,440	16,272,960
TOTALS		8	663,630	104,179,970

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 91250- 109499

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT HS PASSENGER
AZO	CHI	116	107,550	12,475,800
CHI	CMJ	130	100,490	13,063,700
CHI	IND	167	93,040	15,537,680
CHI	SPI	172	107,710	18,526,120
NVC	PVD	149	100,560	15,084,000
TOTALS	5		509,350	74,687,300

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SVNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 109500- 127749

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT AS PASSENGER
ATL	HSV	151	124,850	18,852,350
AUS	DAL	182	124,550	23,290,850
CHI	GRB	181	110,600	20,018,600
MDT	PIT	182	121,110	22,042,020
NYC	SYR	197	127,080	25,034,760
TOTALS		5	608,190	109,238,580

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.V6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 146000- 164249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
BAL NYC	179	153,030	27,392,370
LHI PIA	131	156,780	20,538,180
TOTALS	2	309,810	47,930,550

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 100- 199 TRAFFIC DENSITY: 164250- 182499

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
CHI	MSN	118	171,640	20,253,520
PHL	WAS	133	177,510	23,608,830
TOTALS		2	349,150	43,862,350

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
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ABR MSP	257	17,780	4,569,460
ALB BAL	288	17,300	5,005,440
ALO MKC	263	9,580	2,519,540
ART NYC	248	9,730	2,413,040
ATL HXY	225	16,850	3,791,250
ATL INT	294	18,120	5,327,280
AVP BOS	253	16,170	4,107,180
BUR WAS	269	9,360	2,517,840
BFD NYC	253	11,730	2,967,690
BFI EUG	237	8,550	2,026,350
BFI LWS	262	10,470	2,743,140
BGM BOS	255	15,470	3,944,850
BGM PIT	251	8,570	2,151,070
BLF CVG	224	8,700	1,948,800
BLF WAS	242	10,600	2,565,200
BNA TRI	239	17,670	4,240,800
BOI GEG	287	10,230	2,936,010
BOI IDA	209	9,430	1,970,870
BOI SLC	290	15,660	4,557,060
BPT MSY	226	17,630	3,984,380
BUF CMH	296	11,420	3,380,320
BUF HPN	289	10,530	3,043,170
BUF PHL	282	9,550	2,693,100
CAK IND	268	14,160	3,794,880
CHA MEM	270	16,770	4,544,670
CHI DTT	238	15,650	3,724,700
CHI ESC	267	12,830	3,425,610
CHI IMT	272	10,740	2,921,280
CHI MWM	224	9,090	2,036,160
CID STL	228	12,690	2,893,320
CLE CVG	226	17,570	3,970,820
CLE ELM	256	15,270	3,909,120
CLE GRR	216	7,740	1,671,840
CLE MDT	274	11,050	3,027,700
CLT ORF	289	18,010	5,204,890
CLT RIC	256	15,570	3,985,920
CRW WAS	238	10,840	2,579,920
CVG PIT	256	13,330	3,412,480
DAL HOT	232	16,870	3,913,840
DAL LCH	273	11,530	3,147,690
DAL PUE	236	11,800	2,784,800
DAY MKE	285	16,080	4,582,800

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT	
			RS	PASSENGER
DEN FMN	277	11,200		3,102,400
DEN LBF	239	10,980		2,635,200
DEN RIW	293	8,680		2,551,920
DTT GRB	291	11,270		3,279,570
DTT PLN	239	13,260		3,169,140
DTT SSM	294	9,280		2,728,320
ELM PIT	208	15,820		3,290,560
ELM WAS	226	17,410		3,934,660
ERI MDT	218	12,800		2,790,400
ERI WAS	268	15,160		4,062,880
EUG SEA	237	8,550		2,026,350
FAT LAS	258	10,130		2,623,670
FSM MEM	249	16,290		4,056,210
FYV MEM	245	8,370		2,050,650
FYV STL	282	13,580		3,829,560
GEG PDX	278	12,040		3,347,120
GSO ORF	215	9,220		1,991,520
GSO WAS	243	8,390		2,047,160
HPN ROC	248	14,750		3,658,000
IND MKE	237	15,980		3,787,260
INL MSP	253	11,860		3,012,440
ITH WAS	251	12,960		3,252,960
JAC SLC	204	13,540		2,775,700
JHW NYC	291	12,890		3,750,990
LAX YUM	225	9,920		2,241,920
LBF DMA	250	8,280		2,070,000
LEX PIT	289	15,000		4,335,000
LMT PDX	241	7,730		1,862,930
LWS PIT	209	8,410		1,757,690
LWS SEA	262	10,470		2,743,140
MEM MGM	280	9,100		2,557,100
MEM MDU	212	14,500		3,074,000
MEM TXK	255	8,450		2,154,750
MFR PDX	222	9,300		2,064,600
MKE MLI	268	13,930		3,747,170
MSP SUX	233	8,960		2,087,680
MSP TVF	261	14,380		3,753,180
ORF RDU	210	14,560		3,072,160
PIT RDG	225	11,720		2,637,000
PIT ROC	224	16,170		3,622,080
RIC TRI	290	7,310		2,119,900
ROC WAS	292	17,380		5,074,960

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER HS	TRAFFIC-DISTANCE PRODUCT PASSENGER
RWI WAS	211	7,630	1,609,930
SDA SFD	211	10,350	2,815,200
SDF TRI	218	15,960	3,479,280
TOTALS	87	1,082,690	273,570,590

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD:1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
ABE BOS	258	33,500	8,643,000
ABE PIT	252	32,310	8,142,120
ATL FLO	273	21,530	5,877,690
ATL GTR	241	23,960	5,774,360
ATL MEI	266	21,470	5,732,490
ATL VLD	208	23,230	4,831,840
BAL BDL	283	36,050	10,202,150
BAL CHW	271	23,610	6,421,920
BDL ROC	267	29,140	7,780,380
BHM MEM	211	29,910	6,340,920
BUF WAS	290	32,240	9,344,600
CHI CTD	203	28,040	5,692,120
CHI EAU	278	21,960	6,104,880
CHI MCW	298	24,970	7,441,060
CHI PLN	295	18,740	5,528,300
CHI RHI	273	27,820	8,012,160
CHI UIN	224	19,090	4,276,160
CHO NYC	299	27,550	8,237,450
CID MKC	244	19,120	4,665,280
CID MSP	221	21,720	4,800,120
CLE IND	265	23,530	6,258,980
CPR DEN	231	25,810	5,987,920
CVG DTT	238	28,420	6,763,960
CVG ROA	282	20,410	5,755,620
CVG TRI	216	23,160	5,002,560
DAL FSN	219	27,510	5,914,650
DAL FYV	259	20,110	5,208,490
DEN DRO	238	21,850	5,200,300
DSM MSP	232	29,300	6,797,600
DTT TVC	207	31,300	6,479,100
GFK MSP	284	30,180	8,571,120
GJT SLC	216	19,380	4,186,080
GRB MSP	252	23,650	5,959,800
HPN WAS	240	36,470	8,752,800
HRL IAH	285	31,330	8,960,360
HVN WAS	282	28,330	8,017,390
IAH LFT	201	28,750	5,778,750
INT WAS	251	24,570	6,167,070
ISO WAS	247	21,420	5,290,740
JLN STL	251	29,350	7,366,850
LAS LAX	226	29,290	6,648,830
MCO TLH	225	30,030	6,756,750

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT HS PASSENGER
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MEM STL	255	18,320	4,671,600
MKC STL	229	19,470	4,458,630
MKC SUX	245	18,930	4,637,850
MLI MSP	270	24,100	6,507,000
MLU MSY	203	22,980	4,664,940
MSN MSP	228	18,350	4,183,800
MSP OMA	282	21,030	5,930,460
MSY VPS	226	23,030	5,204,780
OAJ WAS	289	35,410	10,233,490
PHF PHL	205	31,130	6,381,650
PIT SYR	279	35,880	10,010,520
PIT TOL	201	18,510	3,720,510
RDU WAS	224	19,690	4,430,250

TOTALS	55	1,406,940	350,715,220
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ALB BUF	251	48,340	12,133,340
ATL PFN	247	53,100	13,115,700
AVP PIT	243	44,990	10,932,570
BNA MEM	200	47,840	9,568,000
BPT DAL	251	42,760	10,732,760
BTR IAH	253	36,800	9,347,200
CHI CWA	205	51,450	10,547,250
CHI LSE	225	46,130	10,379,250
CHI RST	278	47,000	13,066,000
CHI TVC	226	41,590	9,399,340
DAL SJT	236	37,330	9,332,500
DAL TUL	234	50,250	11,758,500
DAY PIT	214	43,450	9,341,750
DSM STL	260	37,550	9,763,000
EWV WAS	263	38,040	10,042,560
IND STL	229	54,320	12,439,280
LAS SAN	258	37,700	9,726,600
MKE MSP	297	49,340	14,653,980
NYC WAS	215	39,860	8,569,900

TOTALS	19	847,840	204,849,480
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
ACV SFO	239	56,300	13,455,700
ALO CHI	242	61,650	14,967,700
ATL VPS	250	63,730	15,932,500
BAL PIT	210	54,830	11,514,300
BUR LAS	223	60,560	13,565,440
DAL LIT	283	66,210	18,737,430
DEN GJT	200	70,060	14,012,000
DTT MKE	244	56,520	13,790,880
FAY WAS	284	57,840	16,426,560
ISP WAS	256	60,120	15,390,720
KOA LIT	269	57,410	15,443,290
LAS SNA	225	66,830	15,103,580
LAX MRY	273	55,630	15,186,990
NYC ORF	291	55,880	16,261,080
ORF PHL	215	72,490	15,585,350
PHL PVD	231	65,650	15,165,150
SYR WAS	297	57,600	17,107,200
TOTALS	17	1,039,510	257,645,870

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 73000- 91249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ATL TRI	226	78,700	17,864,900
BFI GEG	223	82,180	18,326,140
BOS SYR	264	89,130	23,530,320
BTU NYC	261	85,020	22,190,220
DAL IAH	222	83,040	18,434,880
GEG SEA	223	82,180	18,326,140
LTH OGG	201	80,680	16,297,360

TOTALS	7	580,930	134,969,960
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 91250- 109499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER HS	TRAFFIC-DISTANCE PRODUCT PASSENGER
ALB PHL	208	93,270	19,400,160
LAS PHX	255	94,870	24,191,850
TOTALS	2	188,140	43,592,010

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 200- 299 TRAFFIC DENSITY: 109500- 127749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGE	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
BUF NYC	289	112,200	32,425,800
CHI STL	256	127,040	32,522,240
NYC ROC	252	118,890	29,960,280
TOTALS	3	358,130	94,908,320

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS DISTANCE UNITS TRAFFIC UNITS TRAFFIC-DISTANCE PRODUCT
MILES PASSENGER RS PASSENGER

ABQ	PHX	328	16,130	5,306,770
ATL	BLF	310	7,380	2,295,180
ATL	LYH	389	14,270	5,551,030
AUS	LBB	335	9,440	3,162,400
DUL	ORF	395	15,260	6,027,700
BGM	CLE	304	14,070	4,277,280
BHM	MSY	321	14,710	4,721,910
BNA	GSO	377	11,650	4,392,050
BOI	PDX	344	11,670	4,014,480
BOS	ELM	302	13,200	3,986,400
BTR	DAL	358	10,260	3,673,080
BUF	DAY	353	13,450	4,747,850
BUF	PVD	383	12,060	4,618,980
BZN	SLC	346	8,200	2,845,400
CAK	NYC	391	15,360	6,005,760
CAK	PHL	341	10,590	3,611,190
CHI	CMA	367	10,830	3,974,610
CHI	COU	320	10,000	3,200,000
CHI	HTS	367	7,990	2,932,330
CHI	IWD	350	7,980	2,793,000
CHI	SSM	360	9,020	3,247,200
CMH	MDT	322	7,430	2,392,460
CRE	WAS	360	15,160	5,457,600
CRP	DAL	351	17,470	6,166,910
CVG	RDV	390	7,390	2,882,100
DAL	JLN	320	9,110	2,915,200
DAL	LFT	327	16,740	5,473,980
DAL	SGF	354	16,800	5,947,200
DAY	MDT	393	7,440	2,923,920
DEN	GRJ	356	12,300	4,378,800
DEN	SLN	393	8,300	3,261,900
DCH	MKE	342	7,900	2,701,800
DTT	ELM	322	9,460	3,046,120
DTT	MDT	362	7,920	2,867,040
DTT	MDT	363	11,010	3,996,630
DTT	SYR	364	11,030	4,014,920
FSM	STL	323	9,050	2,923,150
GPT	MEM	325	11,340	3,685,500
GSO	SDF	351	8,510	2,987,010
HSV	MSY	379	13,290	5,036,910
JAR	LIT	383	10,430	3,994,690
LAS	SLC	368	13,340	4,909,120

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT HS PASSENGER
LAS	TUS	364	13,030	4,742,920
LAX	SFO	354	11,210	3,979,550
LMT	SFO	305	9,690	2,955,450
LYH	NYC	366	16,240	5,943,840
MCO	VPS	342	10,120	3,461,040
MEM	TUL	342	9,210	3,149,820
MEM	TYS	342	8,920	3,050,640
MFR	SFO	319	9,960	3,177,240
MKC	RST	348	7,350	2,557,800
MKE	SDF	348	10,190	3,546,120
PHL	PKB	339	9,400	3,186,600
ROA	SDF	321	13,700	4,397,700
UCA	WAS	309	12,810	3,958,290
TOTALS	55		616,770	215,454,570

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.V6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 10250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ABQ DEN	339	23,100	7,830,900
ABQ TUS	321	22,700	7,309,400
ALB PIT	367	33,330	12,232,110
AMA DEN	359	27,310	9,804,290
ATL CME	328	23,850	7,846,650
ATL MOB	302	19,050	5,753,100
AVL WAS	377	30,110	11,351,470
BAL CMH	336	19,240	6,464,640
BAL PVD	328	21,780	7,143,840
BIL SLC	387	20,450	7,914,150
BNA CLT	328	20,240	6,658,960
BUR PHX	369	21,500	7,933,500
CHI ERI	391	29,410	11,499,310
CHI MDT	322	24,700	7,953,400
CLE SYR	312	31,650	9,874,800
CMH MKE	331	20,360	6,739,160
CVG MKE	318	19,050	6,057,900
DAL MAF	319	20,300	6,759,900
DAY STL	339	21,540	7,302,060
DEW RAP	309	33,520	10,391,200
ERI PHL	304	33,480	10,177,920
FSD MKC	327	18,840	6,160,680
GOW WAS	322	32,010	10,307,220
IAH MSY	303	27,970	8,474,910
ILM WAS	320	29,900	9,597,900
IND PIT	324	21,380	6,948,500
ITO LIH	317	22,490	7,151,820
LAS SJC	391	34,400	13,450,400
MEN MOB	317	18,380	5,844,840
ONT PHX	322	30,730	9,895,060
ORF PIT	330	23,150	7,639,500
TRI WAS	328	26,710	8,760,880

TOTALS	32	802,630	269,230,370
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT HS PASSENGER
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ATL GPT	352	38,660	13,608,320
ATL ILM	377	47,650	17,964,050
BDL BUF	317	41,350	13,107,950
BOS MDT	336	43,180	14,551,660
CHI DSM	306	44,510	13,620,060
DEN SLC	381	53,830	20,509,230
ERI NYC	335	45,000	15,075,000
IAH MFE	308	38,440	11,839,520
MKE STL	317	44,890	14,230,130
NYC ROA	399	52,750	21,047,250
PIT SUP	335	38,830	13,008,050

TOTALS	11	489,090	168,561,220
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CA8DB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS		DISTANCE UNITS	TRAFFIC UNITS	TRAFFIC-DISTANCE PRODUCT
		MILES	PASSENGER	PASSENGER

ATL	ROA	357	69,880	24,947,160
BOS	BUF	396	64,340	25,478,640
CHI	MSP	344	58,900	20,261,600

TOTALS	3		193,120	70,687,400
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD:1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 73000- 91249

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
BOS	ROC	343	78,650	26,976,950
LAS	RNO	345	79,890	27,562,050
PHX	SNA	340	86,630	29,454,200
TOTALS		3	245,170	83,993,200

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 91250- 109499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGE	RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
ALB WAS	321	102,930		33,040,530
ATL FAY	330	96,020		31,686,600
PVD WAS	364	107,460		39,115,440
TOTALS	3	306,410		103,842,570

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 300- 399 TRAFFIC DENSITY: 146000- 164249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGE HS	TRAFFIC-DISTANCE PRODUCT PASSENGER
BAL BOS	370	154,660	57,224,200
BDL WAS	319	161,330	51,464,270
TOTALS	2	315,990	108,688,470

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 400- 499 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ATL CHO	456	7,500	3,427,500
BFI SUI	400	11,310	4,524,000
BHM MCO	475	16,910	8,032,250
BNA RDU	443	10,500	4,651,500
BUI SEA	400	11,310	4,524,000
BOS WAS	406	10,930	4,437,580
BTV WAS	439	12,980	5,698,220
BUF CVG	410	9,590	3,931,900
BUF IND	450	10,470	4,711,500
CAK STL	497	13,500	6,709,500
CHI JLN	485	9,870	4,786,950
CMH NYC	472	10,270	4,847,440
CMH PHL	412	17,680	7,284,160
CRW NYC	438	18,230	7,984,740
DAL LOI	402	11,160	4,486,320
DAL ROW	447	13,410	6,195,420
DAY PHL	483	13,430	6,486,690
DAY SYR	475	7,680	3,648,000
DEN FSD	496	8,140	4,037,440
DEN JAC	402	15,140	6,086,280
DEN LBB	454	13,420	6,092,680
DEN MHK	441	7,530	3,320,730
DEN DWA	484	14,580	7,056,720
GRR MSP	408	9,450	3,855,600
HTS NYC	486	9,060	4,403,160
HTS PHL	413	7,560	3,122,280
IAH LBB	466	8,100	3,774,600
ILM NYC	495	15,420	7,632,900
INT NYC	464	13,360	6,199,040
ISO NYC	423	13,310	5,630,130
LAS OAK	408	8,650	3,529,200
LAS SFO	419	12,610	5,283,590
MCO MGM	400	9,540	3,816,000
MEM TRI	436	9,250	4,042,250
MKE MKE	438	15,170	6,644,460
MSO SLC	435	12,390	5,402,040
MSP RAP	490	9,630	4,718,700
NYC PAB	407	8,260	3,361,820
ORF PVD	420	14,170	5,951,400
PHL TOL	470	14,950	7,026,500
RIC SUP	463	10,830	5,014,290
SNA TUS	418	16,930	7,076,740

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 400- 499 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER HS	TRAFFIC-DISTANCE PRODUCT PASSENGER
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TOTALS	42	494,180	219,446,220
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 400- 499 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
ALB CLE	419	31,080	13,022,520
ATL EWN	433	21,220	9,188,260
ATL ISO	405	18,570	7,539,420
ATL OAJ	407	34,780	14,155,460
BAL SDF	495	18,450	9,132,750
BIL DEN	456	23,260	10,629,820
BNA PIT	461	18,500	8,547,000
CHI MEM	485	21,830	10,587,550
CHI SGF	438	24,210	10,603,980
CMH STL	410	29,540	12,111,400
DAL HRL	458	24,270	11,164,200
DAL MFE	467	28,900	13,554,100
DAL MKC	448	21,060	9,434,880
DEN LAX	435	20,090	8,739,150
DEN SUX	479	30,820	14,762,780
EUG SFO	440	25,920	11,404,800
FAY NYC	478	29,150	13,933,700
MDT MSP	449	19,570	8,786,930
PIT PVD	467	23,120	10,797,040
TOTALS	19	464,340	208,095,740

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 400- 499 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
BAL	CVG	430	43,650		18,769,500
BOS	DMF	468	50,890		23,816,520
CHI	FSD	471	53,570		25,231,470
CHI	SUX	444	47,590		21,129,960
MIA	TLH	403	36,670		14,778,010
TOTALS		5	232,370		103,725,460

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 400- 499 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
BDL PIT	406	58,390	23,706,340
CHI DLH	407	55,510	22,592,570
LAX TUS	438	57,420	25,149,960
MSP STL	448	70,380	31,530,240
TOTALS	4	241,700	102,979,110

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 400- 499 TRAFFIC DENSITY: 73000- 91249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT AS PASSENGER
BOS PIT	496	75,830	37,611,680
CHI PIT	404	82,250	33,229,000
TOTALS	2	158,080	70,840,680

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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 500- 599 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS	TRAFFIC UNITS	TRAFFIC-DISTANCE PRODUCT
	MILES	PASSENGER	HS PASSENGER

ACV LAX	584	11,390	6,651,760
AMA IAH	528	11,130	5,816,640
ATL WAS	540	9,090	4,908,600
AVL NYC	592	17,310	10,247,520
BDL CMH	549	14,160	7,788,000
BNA ORF	585	9,730	5,692,050
BNA RIC	527	10,490	5,528,230
BOS CLE	558	7,350	4,101,300
CHI ELM	559	16,770	9,374,430
CHI INL	537	9,290	4,988,730
CHI IPT	563	7,190	4,365,770
CHI ROA	521	15,430	8,039,030
CLT MEM	512	15,030	7,695,360
CMH WAS	595	14,990	8,919,050
CVG MSP	596	9,780	5,828,880
DAL DMA	585	12,070	7,060,950
DAY MSP	575	13,630	7,837,250
DAY NYC	543	13,550	7,357,650
DEN OKC	500	7,640	3,820,000
GEG SLC	547	16,350	8,943,450
GSO MEM	569	10,220	5,825,400
LAX SLC	583	7,330	4,273,390
LEX NYC	598	14,460	8,647,080
LEX PHL	526	7,340	3,860,840
MIA VPS	500	8,540	4,270,000
ORF SDF	531	11,230	5,963,130
PDX SFO	540	8,180	4,417,200
SLC SNA	587	17,790	10,442,730

TOTALS	28	328,060	182,744,420
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 500- 599 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
ABQ	DAL	580	35,870	21,306,780
ATL	ORF	516	28,860	14,902,080
BAL	IND	515	27,310	14,064,650
BDL	DTT	540	27,000	14,580,000
BTS	DEN	526	26,210	13,786,460
DEN	PHX	589	34,300	20,202,700
DTT	MSP	534	33,040	17,643,360
NYC	TRI	542	25,120	13,615,040
PIT	STL	553	31,680	17,550,720
TOTALS			269,410	147,651,790

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 500- 599 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
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DAL	STL	537	49,190		26,415,030
DEN	MKC	552	44,840		24,751,680
PHL	SDF	583	43,430		25,319,690

TOTALS		3	137,460		76,486,400
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY AIR TRANSPORTATION STUDY

DISTANCE RANGE: 500- 599 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
CHI	MDT	584	59,930	34,999,120
PHX	SLC	507	59,620	30,227,340
TOTALS		2	119,550	65,226,460

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 600- 699 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
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ABE CHI	647	10,850	7,019,950
ALO DEN	677	15,460	10,481,880
BDL CVG	661	8,070	5,334,270
BDL DAY	619	15,990	9,897,810
BGM CHI	607	15,130	9,183,910
BHM MIA	661	12,300	8,130,300
BOS DTT	623	10,170	6,335,910
CHI GFK	623	18,110	11,282,530
CHI JAN	672	8,710	5,853,120
CMH MSP	627	8,490	5,323,230
CSG WAS	617	15,850	9,779,450
DAL MLI	682	7,380	5,047,920
DEN GTF	624	10,090	6,296,160
DEN MDI	612	16,500	10,114,500
DTT PVD	606	10,840	6,569,040
NYC SDF	653	7,780	5,080,340
PDX SLC	630	14,900	9,387,000
PHX RNO	600	11,310	6,797,310
PHX SFO	657	7,660	5,032,620
PIA WAS	673	10,100	6,797,300
SLC TUS	600	10,150	6,090,000

TOTALS	21	245,840	155,834,550
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TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 600- 699 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE MILES	UNITS PASSENGER	TRAFFIC-UNITS RS	TRAFFIC-DISTANCE PRODUCT PASSENGER
BFI KTN	676	25,320		17,116,320
BFI SLC	690	25,490		17,613,590
BNA PHL	681	33,420		22,759,020
KTN SEA	676	25,320		17,116,320
MCO MEM	681	19,070		12,986,670
MEM PIT	651	20,560		13,405,120
PHX SJC	627	27,130		17,010,510
SEA SLC	691	25,490		17,613,590
TOTALS	8	201,800		135,621,140

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 600- 699 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
ABQ LAX	665	42,860	28,501,900
AVP CHI	624	42,170	26,314,080
DEN MSP	692	52,470	36,361,710
DEN TUS	627	37,600	23,575,200
IND NYC	654	38,590	25,237,860
TOTALS	5	213,690	139,990,750

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.V6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 600- 699 TRAFFIC DENSITY: 54750- 72999

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
DEN LAS	616	72,780	44,832,480
TOTALS	1	72,780	44,832,480

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABD84.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 600- 699 TRAFFIC DENSITY: 73000- 91249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
DAL DEN	654	78,340	52,017,760
TOTALS	1	78,340	52,017,760

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 700- 799 TRAFFIC DENSITY: 7300- 18249

CITY-PAIRS		DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
AUS	DEN	769	7,970	6,128,930
BAL	STL	737	15,500	11,423,500
BDL	IND	727	17,510	12,747,280
BOS	CVG	752	7,700	5,790,400
CHI	MDT	793	15,310	12,140,830
CHI	NYC	721	12,280	8,853,880
CMI	NYC	755	14,820	11,189,100
DAL	GJT	783	8,200	6,519,000
DEN	SAT	794	15,070	11,965,580
EUG	LAX	752	14,330	10,776,160
EVV	NYC	748	12,110	9,058,280
GRB	NYC	765	7,300	5,584,500
MEM	ORF	781	10,500	8,211,000
MSP	RUC	783	7,860	6,154,380
VPS	WAS	783	13,480	10,554,840
TOTALS	15		179,940	137,097,660

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.V6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 700- 799 TRAFFIC DENSITY: 18250- 36499

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
BUF MSP	734	25,730	18,885,820
TOTALS	1	25,730	18,885,820

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 700- 799 TRAFFIC DENSITY: 36500- 54749

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGE	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
DEN STL	781	53,720	41,955,320
TOTALS	1	53,720	41,955,320

TRAFFIC RANGE AND DENSITY REPORT FOR ORIGIN/DESTINATION CITY-PAIRS

DATA SOURCE: CABDB4.Y6872.SYNC PERIOD: 1972

MEDIUM DENSITY
AIR TRANSPORTATION
STUDY

DISTANCE RANGE: 700- 799 TRAFFIC DENSITY: 73000- 91249

CITY-PAIRS	DISTANCE UNITS MILES	TRAFFIC UNITS PASSENGER	TRAFFIC-DISTANCE PRODUCT RS PASSENGER
MKE NYC	733	85,930	62,986,690
TOTALS	1	85,930	62,986,690

B.2 INITIAL MEDIUM DENSITY NETWORK AND TRAFFIC MODEL

The following series of tables describe the initial medium density network and traffic model. Computer printout sheets are included for a representative part of the total model. Table B-2 lists each airport pair in a range class together with data derived from the 1972 schedule of airline service. Each range class becomes a model element for which pertinent data are summarized in a line of data identified by the range limits. Each piece of data is identified by headings at the top of each page. Table B-3 lists the summary data for each numbered element in the mission model. Essential data are identified by column headers. Table B-4 is the total traffic model with the base year of 1972. Service class refers to the geographic region and airline, passengers per day is equivalent to segment seats demanded per day where a segment is an airport pair route; passengers per day, passengers per trip and seats per trip are not essential to the analysis in this study; the minimum trips is the number of trips actually scheduled in the base year of 1972. Table B-5 is a printout from the operational simulation routine which shows the basic schedule and demand data for 1980 in each of the six geographic regions. Passengers are interpreted as demand for seats by segment and should not be confused with Origin and Destination passengers as recorded by the CAB. The pertinent trips per year is the last column labeled minimum trips, which is the minimum service level to be met by any candidate aircraft.

ROUTE DATA BY EQUIPMENT TYPE F7

EQUIPMENT TYPE F7

RANGE	CLASS	TRIPS/DAY	SEATS/DAY	SEATS/TRIP	SEAT-MILES	TRIP-MILES	RANGE BAR	RCLASS	TCLASS	NCP	TIME/TRIP
	SFA - TIW	5.00	200.	18	4						
	TIW - SFA	5.00	200.	18	4						
	OLM - TIW	5.00	200.	25	4						
	TIW - OLM	5.00	200.	25	4						
	LWS - PUW	14.00	560.	26	4						
	PUW - LWS	21.00	840.	26	4						
	SFO - SJC	7.00	280.	31	4						
	SJC - SFO	7.00	280.	31	4						
	FAT - EPH	10.00	400.	33	4						
	EPH - FAT	10.00	400.	33	4						
	LAX - SNA	5.00	200.	37	4						
	SNA - LAX	5.00	200.	37	4						
	APV - ONT	7.00	280.	40	4						
	ONT - APV	7.00	280.	40	4						
	ALW - PSC	14.00	560.	41	4						
	PSC - ALW	7.00	280.	41	4						
	HQM - OLM	5.00	200.	49	4						
	LAX - OXR	10.00	400.	49	4						
	OLM - HQM	5.00	200.	49	4						
	OXR - LAX	10.00	400.	49	4						
	IDA - PIH	20.00	800.	50	4						
	PIH - IDA	14.00	560.	50	4						
1-	50	28.29	1131.	40.	42257.	1056.	37	11.	4	22	0.32
	CIC - RDD	13.00	520.	55	4						
	PRB - SMX	12.00	480.	55	4						
	RDD - CIC	13.00	520.	55	4						
	SMX - PRB	12.00	480.	55	4						
	LAX - PMD	14.00	560.	56	4						
	PMD - LAX	14.00	560.	56	4						
	AST - HQM	5.00	200.	57	4						
	HQM - AST	5.00	200.	57	4						
	FAT - YKM	14.00	560.	59	4						
	YKM - FAT	7.00	280.	59	4						
	APV - PMD	7.00	280.	60	4						
	PMD - APV	7.00	280.	60	4						
	IPL - YUM	14.00	560.	63	4						
	YUM - IPL	14.00	560.	63	4						
	ALW - LWS	14.00	560.	64	4						
	GEG - PUW	19.00	760.	64	4						
	LWS - ALW	7.00	280.	64	4						
	PUW - GEG	12.00	480.	64	4						
	SCK - SFO	6.00	240.	65	4						
	SFO - SCK	6.00	240.	65	4						
	SFO - STS	10.00	400.	65	4						
	STS - SFO	10.00	400.	65	4						
	IYK - PMD	5.00	200.	67	4						
	PMD - IYK	5.00	200.	67	4						
	CEC - EKA	13.00	520.	68	4						
	EKA - CEC	13.00	520.	68	4						
	BKE - ONO	5.00	200.	69	4						
	ONO - BKE	5.00	200.	69	4						
	PSC - YKM	5.00	200.	72	4						
	PUW - ALW	7.00	280.	72	4						
	YKM - PSC	5.00	200.	72	4						
	AST - PDX	5.00	200.	73	4						
	PDX - AST	5.00	200.	73	4						
	GON - PGA	7.00	280.	77	4						
	PGA - GON	7.00	280.	77	4						

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	LAS	-	GCN	14.00	280.	169	4										
	PSC	-	SEA	14.00	560.	172	4										
	SEA	-	PSC	7.00	280.	172	4										
	LAS	-	PSP	7.00	280.	173	4										
	PSP	-	LAS	7.00	280.	173	4										
	GCN	-	PHX	7.00	280.	174	4										
	PHX	-	GCN	7.00	280.	174	4										
	IPL	-	LAX	14.00	560.	176	4										
	LAX	-	IPL	14.00	560.	176	4										
	BOI	-	PIH	14.00	560.	188	4										
	PIH	-	BOI	20.00	800.	188	4										
	RNO	-	SJC	7.00	280.	188	4										
	SJC	-	RNO	7.00	280.	188	4										
	LAS	-	ONT	28.00	1120.	197	4										
	ONT	-	LAS	28.00	1120.	197	4										
	BOI	-	LWS	7.00	280.	198	4										
	LWS	-	BOI	7.00	280.	198	4										
	RDD	-	SFO	7.00	280.	199	4										
	SFO	-	RDD	7.00	280.	199	4										
151- 200				49.29	1971.	40.		348286.	8707.	176	11.	4	32	0.93			
	BOI	-	IDA	6.00	240.	209	4										
	ODC	-	SLC	7.00	280.	221	4										
	SLC	-	ODC	7.00	280.	221	4										
	BUR	-	LAS	2.00	80.	222	4										
	LAS	-	BUR	2.00	80.	222	4										
	BFL	-	LAS	7.00	280.	223	4										
	LAS	-	BFL	7.00	280.	223	4										
	BOI	-	PUW	5.00	200.	224	4										
	PUW	-	BOI	5.00	200.	224	4										
	LAX	-	LHU	5.00	200.	234	4										
	LHU	-	LAX	5.00	200.	234	4										
	LMT	-	SME	7.00	280.	238	4										
	SME	-	LMT	7.00	280.	238	4										
	EKA	-	SFO	13.00	520.	240	4										
	SFO	-	EKA	13.00	520.	240	4										
	LMT	-	PDX	7.00	280.	241	4										
	PDX	-	LMT	7.00	280.	241	4										
	SBA	-	SFO	7.00	280.	263	4										
	SFO	-	SBA	7.00	280.	263	4										
201- 300				18.00	720.	40.		168949.	4224.	234	11.	4	19	1.18			
TOTALS				211.71	8469.	40.		363794.	24095.	113			159	0.65			

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TABLE B-3
SUMMARY OF ROUTE DATA BY
MODEL ELEMENT NUMBER

EQUIPMENT F7									
ELEMENT NO.	EQUPT	RANGE	SEATS/DAY FRACTION	TRIPS/DAY FRACTION	SEAT-MILES FRACTION	TRIP-MILES FRACTION	RANGE CLASS	SERVICE CLASS	AIRPORT PAIRS
114	F7	37.	1131.0	28.3	42257.	1056.	11.	4	22
			*****28.28999329 0.000025468 0.000079308						
115	F7	73.	3143.0	78.6	229583.	5740.	11.	4	53
			*****78.56999207 0.000138370 0.000431087						
116	F7	116.	1503.0	37.6	174720.	4368.	11.	4	33
			*****37.56999207 0.000105304 0.000328047						
117	F7	176.	1971.0	49.3	348286.	8707.	11.	4	32
			*****49.28999329 0.000209912 0.000653916						
118	F7	234.	720.0	18.0	168949.	4224.	11.	4	19
			*****18.00000000 0.000101825 0.000317232						
EQUIPMENT TOTALS			8468.	212.	963795.	24095.			
			0.00326169	0.00638711	0.000580879	0.001809591			159

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1972
AIR TRANSPORTATION FORECAST

SERVICE CLASS	RANGE ST. MI	PSNGRS /DAY	TRIPS /DAY	SEATS /DAY	PSNGR /TRIP	SEATS /TRIP	MIN.	TRIPS	OPERATION CLASS
1	43.	435.	120.	888.	3.6	7.4		12.	11.
1	69.	1849.	510.	3774.	3.6	7.4		51.	11.
1	126.	2865.	790.	5846.	3.6	7.4		79.	11.
1	184.	1342.	370.	2738.	3.6	7.4		37.	11.
1	253.	4206.	1160.	8584.	3.6	7.4		116.	11.
1	349.	1777.	490.	3626.	3.6	7.4		49.	11.
1	443.	254.	70.	518.	3.6	7.4		7.	11.
1	535.	109.	30.	222.	3.6	7.4		3.	11.
1	642.	73.	20.	148.	3.6	7.4		2.	11.
1	22.	175.	239.	358.	0.7	1.5		24.	11.
1	121.	103.	140.	210.	0.7	1.5		14.	11.
1	32.	219.	297.	446.	0.7	1.5		30.	11.
3	43.	23.	30.	45.	0.8	1.5		3.	11.
3	65.	78.	100.	150.	0.8	1.5		10.	11.
1	78.	624.	849.	1273.	0.7	1.5		85.	11.
1	109.	170.	231.	347.	0.7	1.5		23.	11.
3	135.	31.	40.	60.	0.8	1.5		4.	11.
3	160.	8.	10.	15.	0.8	1.5		1.	11.
1	173.	78.	106.	159.	0.7	1.5		11.	11.
1	36.	1106.	451.	2257.	2.4	5.0		45.	11.
2	43.	1358.	571.	2743.	2.4	4.8		57.	11.
3	43.	1300.	500.	2500.	2.6	5.0		50.	11.
3	70.	3633.	1397.	6986.	2.6	5.0		140.	11.
1	72.	2548.	1040.	5200.	2.4	5.0		104.	11.
2	73.	6171.	2596.	12467.	2.4	4.8		260.	11.
1	121.	2275.	929.	4643.	2.4	5.0		93.	11.
2	122.	2359.	993.	4766.	2.4	4.8		99.	11.
3	124.	2931.	1127.	5636.	2.6	5.0		113.	11.
3	173.	1493.	574.	2871.	2.6	5.0		57.	11.
1	174.	2587.	1056.	5279.	2.5	5.0		106.	11.
2	175.	563.	237.	1138.	2.4	4.8		24.	11.
3	234.	988.	380.	1900.	2.6	5.0		38.	11.
1	238.	1687.	689.	3443.	2.4	5.0		69.	11.
2	239.	720.	303.	1454.	2.4	4.8		30.	11.
1	320.	154.	63.	314.	2.4	5.0		6.	11.
2	325.	129.	54.	261.	2.4	4.8		5.	11.
3	339.	130.	50.	250.	2.6	5.0		5.	11.
3	404.	208.	80.	400.	2.6	5.0		8.	11.
1	536.	49.	20.	100.	2.4	5.0		2.	11.
5	40.	434.	221.	886.	2.0	4.0		22.	11.
5	76.	1638.	836.	3343.	2.0	4.0		84.	11.
5	124.	1176.	600.	2400.	2.0	4.0		60.	11.
5	173.	627.	320.	1280.	2.0	4.0		32.	11.
5	239.	221.	113.	451.	2.0	4.0		11.	11.
5	369.	20.	10.	40.	2.0	4.0		1.	11.
2	35.	68.	19.	137.	3.6	7.4		2.	11.
5	38.	357.	97.	729.	3.7	7.5		10.	11.
4	38.	195.	54.	407.	3.6	7.5		5.	11.
2	74.	487.	133.	983.	3.7	7.4		13.	11.
5	75.	3003.	817.	6129.	3.7	7.5		82.	11.

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1972
AIR TRANSPORTATION FORECAST

SERVICE CLASS	RANGE ST. MI	PSNGRS /DAY	TRIPS /DAY	SEATS /DAY	PSNGR /TRIP	SEATS /TRIP	MIN. TRIPS	OPERATION CLASS
4	76.	143.	40.	300.	3.6	7.5	4.	11.
4	110.	251.	70.	525.	3.6	7.5	7.	11.
2	128.	549.	150.	1110.	3.7	7.4	15.	11.
5	128.	1859.	506.	3793.	3.7	7.5	51.	11.
4	173.	179.	50.	375.	3.6	7.5	5.	11.
5	176.	2656.	723.	5421.	3.7	7.5	72.	11.
2	179.	178.	49.	359.	3.7	7.4	5.	11.
4	235.	522.	146.	1093.	3.6	7.5	15.	11.
5	238.	2872.	781.	5861.	3.7	7.5	78.	11.
2	255.	623.	170.	1258.	3.7	7.4	17.	11.
5	333.	782.	213.	1596.	3.7	7.5	21.	11.
4	350.	532.	149.	1114.	3.6	7.5	15.	11.
2	439.	131.	36.	264.	3.7	7.4	4.	11.
4	450.	72.	20.	150.	3.6	7.5	2.	11.
5	454.	609.	166.	1243.	3.7	7.5	17.	11.
2	563.	73.	20.	148.	3.7	7.4	2.	11.
5	579.	73.	20.	150.	3.7	7.5	2.	11.
5	642.	431.	117.	879.	3.7	7.5	12.	11.
2	660.	37.	10.	74.	3.7	7.4	1.	11.
5	784.	110.	30.	225.	3.7	7.5	3.	11.
5	866.	73.	20.	150.	3.7	7.5	2.	11.
4	27.	471.	96.	986.	4.9	10.3	10.	11.
2	41.	250.	51.	505.	4.9	9.8	5.	11.
1	49.	7.	1.	14.	4.9	10.0	0.	11.
1	72.	1323.	270.	2700.	4.9	10.0	27.	11.
2	75.	3358.	691.	6784.	4.9	9.8	69.	11.
4	76.	964.	196.	2016.	4.9	10.3	20.	11.
4	118.	2166.	440.	4532.	4.9	10.3	44.	11.
2	125.	2819.	579.	5695.	4.9	9.8	58.	11.
1	125.	1470.	300.	3000.	4.9	10.0	30.	11.
4	177.	457.	93.	956.	4.9	10.3	9.	11.
2	179.	1763.	363.	3562.	4.9	9.8	36.	11.
1	188.	1421.	290.	2900.	4.9	10.0	29.	11.
4	246.	2651.	539.	5547.	4.9	10.3	54.	11.
2	249.	3726.	767.	7528.	4.9	9.8	77.	11.
1	252.	5439.	1110.	11100.	4.9	10.0	111.	11.
2	325.	443.	91.	895.	4.8	9.8	9.	11.
1	339.	2695.	550.	5500.	4.9	10.0	55.	11.
4	351.	1554.	316.	3252.	4.9	10.3	32.	11.
1	425.	2240.	457.	4571.	4.9	10.0	46.	11.
4	450.	464.	94.	971.	4.9	10.3	9.	11.
2	461.	466.	97.	942.	4.8	9.7	10.	11.
1	528.	245.	50.	500.	4.9	10.0	5.	11.
4	537.	584.	119.	1221.	4.9	10.3	12.	11.
2	560.	466.	97.	942.	4.8	9.7	10.	11.
4	629.	204.	41.	427.	4.9	10.3	4.	11.
1	658.	392.	80.	800.	4.9	10.0	8.	11.
2	691.	294.	60.	594.	4.9	9.9	6.	11.
1	732.	294.	60.	600.	4.9	10.0	6.	11.
2	736.	378.	77.	764.	4.9	9.9	8.	11.

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1972
AIR TRANSPORTATION FORECAST

SERVICE CLASS	RANGE ST. MI	PSNGRS /DAY	TRIPS /DAY	SEATS /DAY	PSNGR /TRIP	SEATS /TRIP	MIN.	TRIPS	OPERATION CLASS
4	783.	42.	9.	88.	4.9	10.2		1.	11.
1	873.	98.	20.	200.	4.9	10.0		2.	11.
0	973.	14.	3.	29.	4.8	10.0		0.	11.
1	33.	139.	64.	283.	2.2	4.4		6.	11.
2	43.	556.	244.	1124.	2.3	4.6		24.	11.
1	73.	1001.	464.	2043.	2.2	4.4		46.	11.
2	77.	2957.	1299.	5973.	2.3	4.6		130.	11.
1	117.	413.	191.	842.	2.2	4.4		19.	11.
2	126.	1704.	749.	3443.	2.3	4.6		75.	11.
1	166.	123.	57.	251.	2.2	4.4		6.	11.
2	180.	511.	224.	1032.	2.3	4.6		22.	11.
1	228.	160.	74.	327.	2.2	4.4		7.	11.
2	249.	140.	61.	283.	2.3	4.6		6.	11.
4	37.	541.	283.	1131.	1.9	4.0		28.	11.
4	73.	1502.	786.	3143.	1.9	4.0		79.	11.
4	116.	718.	376.	1503.	1.9	4.0		38.	11.
0	176.	942.	493.	1971.	1.9	4.0		49.	11.
4	234.	344.	180.	720.	1.9	4.0		18.	11.
1	54.	90.	114.	183.	0.8	1.6		11.	11.
5	38.	608.	310.	1240.	2.0	4.0		31.	11.
5	78.	1655.	844.	3377.	2.0	4.0		84.	11.
5	131.	490.	250.	1000.	2.0	4.0		25.	11.
5	164.	577.	294.	1177.	2.0	4.0		29.	11.
5	249.	84.	43.	171.	2.0	4.0		4.	11.
1	25.	191.	150.	390.	1.3	2.6		15.	11.
1	120.	153.	120.	312.	1.3	2.6		12.	11.
1	35.	114.	123.	233.	0.9	1.9		12.	11.
3	45.	50.	60.	96.	0.8	1.6		6.	11.
1	67.	545.	586.	1113.	0.9	1.9		59.	11.
3	88.	67.	80.	128.	0.8	1.6		8.	11.
3	123.	67.	80.	128.	0.8	1.6		8.	11.
2	176.	129.	137.	261.	0.9	1.9		14.	11.
1	34.	1079.	367.	2203.	2.9	6.0		37.	11.
1	75.	3453.	1174.	7046.	2.9	6.0		117.	11.
1	123.	1441.	490.	2940.	2.9	6.0		49.	11.
1	170.	828.	281.	1689.	2.9	6.0		28.	11.
1	251.	681.	231.	1389.	2.9	6.0		23.	11.
1	347.	172.	59.	351.	2.9	6.0		6.	11.
6	30.	1182.	110.	1738.	10.7	15.8		11.	11.
6	92.	231.	21.	339.	10.8	15.8		2.	11.
6	114.	3454.	321.	5079.	10.7	15.8		32.	11.
6	296.	1535.	143.	2257.	10.7	15.8		14.	11.
6	336.	9408.	876.	13836.	10.7	15.8		88.	11.
6	447.	614.	57.	903.	10.8	15.8		6.	11.
6	83.	226.	30.	333.	7.5	11.1		3.	11.
6	113.	377.	50.	555.	7.5	11.1		5.	11.
6	158.	43.	6.	63.	7.5	11.1		1.	11.
6	209.	43.	6.	63.	7.5	11.1		1.	11.
6	346.	517.	69.	761.	7.5	11.1		7.	11.
6	447.	216.	29.	317.	7.5	11.1		3.	11.

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AIR TRANSPORTATION FORECAST

SERVICE CLASS	RANGE ST. MI	PSNGRS /DAY	TRIPS /DAY	SEATS /DAY	PSNGR /TRIP	SEATS /TRIP	MIN. TRIPS	OPERATION CLASS
6	30.	1385.	221.	2037.	6.3	9.2	22.	11.
3	37.	50.	10.	97.	5.0	9.7	1.	11.
3	59.	137.	27.	263.	5.0	9.7	3.	11.
1	80.	1455.	350.	2970.	4.4	9.0	33.	11.
6	81.	2271.	326.	3339.	7.0	10.3	33.	11.
3	106.	353.	70.	679.	5.0	9.7	7.	11.
6	112.	1142.	150.	1680.	7.6	11.2	15.	11.
1	141.	939.	213.	1916.	4.4	9.0	21.	11.
6	158.	261.	34.	384.	7.6	11.2	3.	11.
3	175.	577.	114.	1109.	5.0	9.7	11.	11.
1	181.	1336.	303.	2726.	4.4	9.0	30.	11.
6	212.	588.	77.	864.	7.6	11.2	8.	11.
3	224.	792.	157.	1524.	5.0	9.7	16.	11.
1	255.	1254.	284.	2559.	4.4	9.0	28.	11.
1	347.	1178.	267.	2404.	4.4	9.0	27.	11.
6	347.	4693.	681.	6901.	6.9	10.1	68.	11.
3	347.	937.	186.	1801.	5.0	9.7	19.	11.
1	405.	208.	47.	424.	4.4	9.0	5.	11.
6	454.	556.	79.	817.	7.1	10.4	8.	11.
3	460.	476.	94.	915.	5.0	9.7	9.	11.
1	517.	44.	10.	90.	4.4	9.0	1.	11.
3	566.	490.	97.	942.	5.0	9.7	10.	11.
1	628.	40.	10.	90.	4.4	9.0	1.	11.
3	636.	879.	174.	1691.	5.0	9.7	17.	11.
3	779.	303.	60.	582.	5.0	9.7	6.	11.

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1980 ANNUAL TRAFFIC STATISTICS													
SERVICE CLASS		PASSENGERS (MILL)	SEATS (MILL)	TRIPS (MILL)	RPM (BIL)	SEAT-MILES (BILL)	TRIP-MILES (BILL)	PAX / TRIP	SEAT/ TRIP	R-BAR SEATS (STATUTE MILES)	R-BAR TRIPS (MILES)	AIRPORT PAIRS	MIN. TRIPS (MILL)
TRIPS/DAY MIN	MAX												
1.4 -	61.4	33.361	68.083	6.887	6.460	13.184	1.137	5.7	11.6	194.	165.	902.	0.689
6.7 -	68.5	19.434	39.262	3.989	2.971	6.002	0.539	5.5	11.1	153.	135.	613.	0.399
9.0 -	43.6	9.308	17.899	2.007	1.897	3.648	0.334	5.7	10.9	204.	167.	343.	0.201
1.4 -	23.6	9.026	18.882	1.675	1.859	3.889	0.302	6.2	12.9	206.	180.	322.	0.168
8.6 -	29.3	11.842	24.166	2.676	1.991	4.063	0.408	4.9	9.9	168.	153.	433.	0.268
5.0 -	80.3	16.720	24.588	1.199	4.120	6.058	0.289	14.2	20.9	246.	241.	119.	0.120
TOTAL													
5.0 -	61.4	99.689	192.880	18.433	19.297	36.843	3.010	6.4	12.2	191.	163.	2732.	1.843

AVERAGE TRAFFIC GROWTH RATES FROM 1972 BASE YEAR IN PERCENT/YEAR
0.0 0.0 0.0

RANGE CLASS / NUMBER OF ELEMENTS --- 58/ 0 -- 48/ 0 -- 35/ 0 -- 24/ 0 -- 16/ 0 -- 0/175

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B.3 FINAL MEDIUM DENSITY NETWORK

The final medium density network is described by a series of three tables. Table B-6 details the information by airport pair, airline code (as listed in the Official Airline Guide (OAG)), and by type of equipment used on routes between each airport pair. In Table B-6, RW is Hughes Airwest and Equipment F-27 is the F-27 Turboprop Aircraft. The arrangement of the data generally follows the format in Table B-2 in Section B.2 preceding. Table B-7, Summary of Route Data by Model Number - 1974 is comparable to Table B-3 in the previous section. The total model is represented partially by data from elements 51 to 100 as shown in Table B-8. The format is slightly different from the tabulated information representative of the initial traffic network. Minimum and maximum trips are equal to schedules from 1974 data.

TABLE B-6
ROUTE DATA BY EQUIPMENT TYPE F27 1974
EQUIPMENT TYPE F27

RANGE CLASS	TRIPS/DAY	SEATS/DAY	SEATS/TRIP	SEAT-MILES	TRIP-MILES	RANGE BAR	RCLASS	SCLASS	NAP	TIME/TRIP	FUEL (LBS.)	
	RW	LWS -	PUW	35.00	1400.	26	1	1				
	RW	EAT -	EPH	21.00	840.	34	1	1				
	RW	ALW -	PSC	21.00	840.	41	1	1				
1- 50		11.00	440.	40.	14200.	355.	32	10001.	1	3	1.05	5460.
	RW	IDA -	PIH	28.00	1120.	51	1	1				
	RW	LAX -	PMD	24.00	960.	52	1	1				
	RW	ACV -	CEC	24.00	960.	55	1	1				
	RW	IPL -	YUM	14.00	560.	58	1	1				
	RW	SCK -	SMF	12.00	480.	60	1	1				
	RW	ALW -	LWS	7.00	280.	65	1	1				
	RW	SCK -	SFO	18.00	720.	65	1	1				
	RW	SFO -	STS	18.00	720.	66	1	1				
	RW	SMF -	STS	12.00	480.	67	1	1				
	RW	ALW -	PUW	21.00	840.	73	1	1				
	RW	AST -	PDX	12.00	480.	74	1	1				
	RW	EPH -	PSC	7.00	280.	75	1	1				
	RW	GCN -	PGA	10.00	400.	76	1	1				
	RW	SFO -	SMF	14.00	560.	86	1	1				
	RW	EAT -	SEA	21.00	840.	99	1	1				
51- 100		34.57	1383.	40.	92309.	2308.	66	10001.	1	15	1.21	27703.
	RW	SEA -	YKM	7.00	280.	103	1	1				
	RW	BLH -	PSP	12.00	480.	105	1	1				
	RW	CDC -	PGA	10.00	400.	106	1	1				
	RW	LAX -	PSP	26.00	1040.	110	1	1				
	RW	ALW -	YKM	7.00	280.	113	1	1				
	RW	GCN -	IGM	10.00	400.	113	1	1				
	RW	CEC -	OTH	24.00	960.	115	1	1				
	RW	AST -	SEA	12.00	480.	116	1	1				
	RW	CDC -	GCN	2.00	80.	132	1	1				
	RW	EPH -	LWS	14.00	560.	135	1	1				
101- 150		17.71	709.	40.	80731.	2018.	113	10001.	1	10	1.77	20876.
	RW	BLH -	PHX	12.00	480.	157	1	1				
	RW	PHX -	YUM	14.00	560.	161	1	1				
	RW	IGM -	PHX	10.00	400.	168	1	1				
	RW	OTH -	FLX	24.00	960.	171	1	1				
	RW	GCN -	PHX	2.00	80.	175	1	1				
	RW	IPL -	LAX	14.00	560.	181	1	1				
	RW	EOI -	PIH	28.00	1120.	189	1	1				
151- 200		14.86	594.	40.	103417.	2585.	174	10001.	1	7	2.90	23576.
	RW	BQI -	IDA	24.00	960.	209	1	1				
	RW	CDC -	SLC	10.00	400.	222	1	1				
201- 300		4.86	194.	40.	41349.	1024.	212	10001.	1	2	3.45	8949.
TOTALS		83.00	3320.	40.	332006.	8300.	100			27	1.79	86563.

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TABLE B-7
SUMMARY OF ROUTE DATA BY MODEL NUMBER 1974

EQUIPMENT F27									
ELEMENT NO.	EQUPT	RANGE	SEATS/DAY FRACTION	TRIPS/DAY FRACTION	SEAT-MILES FRACTION	TRIP-MILES FRACTION	RANGE CLASS	SERVICE CLASS	AIRPORT PAIRS
82	F27	32.	440.0	11.0	14200.	355.	10001.	1	3
			*****	11.00000000	0.000007496	0.000025290			
83	F27	66.	1382.9	34.6	92309.	2208.	10001.	1	15
			*****	34.57142639	0.000048727	0.000164399			
84	F27	113.	708.6	17.7	80731.	2018.	10001.	1	10
			*****	17.71427917	0.000042616	0.000143781			
85	F27	174.	594.3	14.9	103417.	2585.	10001.	1	7
			*****	14.85714245	0.000054591	0.000184183			
86	F27	212.	194.3	4.9	41349.	1034.	10001.	1	2
			*****	4.85714245	0.000021827	0.000073641			
EQUIPMENT TOTALS			3320.	83.	332006.	8300.			
			0.00113825	0.00238711	0.000175257	0.000591293			37

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					TABLE B-8 DATA BY ELEMENT NUMBER 1974			
ID	RANGE	PAX	MXTRIP	SEATS	DETAIL OF MODEL SERV NCP	PCLASS	MNTRIP	
51	444.	884.	21.	1683.	1	146039	10001.	21.
52	547.	690.	17.	1315.	1	137666	20001.	17.
53	627.	485.	12.	924.	1	106494	20001.	12.
54	772.	349.	8.	664.	1	86926	20001.	8.
55	851.	170.	4.	324.	1	47003	20001.	4.
56	29.	1658.	184.	3157.	2	28890	10001.	184.
57	31.	765.	82.	1456.	1	12786	10001.	82.
58	68.	1708.	176.	3253.	1	51725	10001.	176.
59	74.	1136.	127.	2164.	2	29620	10001.	127.
60	117.	780.	84.	1486.	2	36529	10001.	84.
61	122.	563.	58.	1072.	1	27407	10001.	58.
62	151.	50.	6.	95.	1	3130	10001.	6.
63	172.	9.	1.	17.	2	495	10001.	1.
64	231.	110.	12.	210.	2	8620	10001.	12.
65	41.	1015.	19.	1932.	1	39930	10001.	19.
66	77.	6405.	124.	12200.	1	315829	10001.	124.
67	122.	7411.	142.	14117.	1	479095	10001.	142.
68	178.	3724.	71.	7093.	1	296491	10001.	71.
69	249.	8866.	169.	16887.	1	871509	10001.	169.
70	343.	3998.	76.	7614.	1	494744	10001.	76.
71	458.	2451.	47.	4669.	1	363791	10001.	47.
72	543.	1400.	27.	2666.	1	231835	20001.	27.
73	667.	1056.	20.	2012.	1	204703	20001.	20.
74	783.	108.	2.	706.	1	23146	20001.	2.
75	834.	267.	5.	509.	1	59933	20001.	5.
76	40.	528.	23.	1006.	1	10685	10001.	23.
77	76.	5415.	148.	6506.	1	112068	10001.	148.
78	125.	1831.	79.	3489.	1	93344	10001.	79.
79	174.	752.	33.	1433.	1	47687	10001.	33.
80	240.	284.	12.	541.	1	23516	10001.	12.
81	356.	86.	4.	163.	1	10198	10001.	4.
82	32.	231.	11.	440.	1	5460	10001.	11.
83	66.	726.	35.	1383.	1	27702	10001.	35.
84	113.	372.	18.	709.	1	20875	10001.	18.
85	174.	312.	15.	584.	1	23575	10001.	15.
86	212.	102.	5.	194.	1	8948	10001.	5.
87	54.	94.	11.	178.	1	1814	10001.	11.
88	38.	390.	19.	743.	1	8313	10001.	19.
89	78.	1002.	48.	1909.	1	34217	10001.	48.
90	138.	285.	14.	543.	1	15114	10001.	14.
91	178.	249.	12.	474.	1	16527	10001.	12.
92	210.	18.	1.	24.	1	1337	10001.	1.
93	27.	238.	17.	453.	1	3664	10001.	17.
94	138.	19.	1.	37.	1	924	10001.	1.
95	196.	94.	7.	178.	1	6721	10001.	7.
96	44.	126.	13.	239.	2	1861	10001.	13.
97	65.	254.	27.	483.	2	4635	10001.	27.
98	119.	454.	48.	864.	2	15154	10001.	48.
99	163.	143.	15.	273.	2	5258	10001.	15.
100	234.	100.	11.	190.	2	4965	10001.	11.

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B.4 OPERATIONAL SIMULATION INPUT AND OUTPUT STATISTICS

Some basic characteristics of conceptual aircraft are shown in Tables B-9 and B-10. These characteristics are partially input and output from the Design/Cost/DOC module of the Performance Evaluation Technique used for operational simulation. In Table B-9, characteristics of seven aircraft are listed. The ID numbers refer to the following tabulations:

<u>ID</u>	<u>Seats</u>	<u>Field Length (Ft/M)</u>	<u>Range (N.Mi/Km)</u>
5311	50	4,500 (1372)	775 (1435)
5111	50	4,500	563 (1042)
5211	50	4,500	337 (624)
3011	30	4,500	566 (1048)
7011	70	4,500	562 (1041)
5411	50	3,500 (1066)	564 (1044)
5611	50	5,500 (1676)	565 (1046)

Weight and performance data generally are input with program and operating costs as output.

Table B-10 presents the DOC functions of the same conceptual aircraft. The cost data is presented at one-tenth increments of design range. The Cost per Trip (actual) is the cost at each range increment computed by the Dougals DOC cost formula discussed in Section 13.1. The Cost per Trip (calculated) is the actual function fitted to a straight line representative of the initial points. It is this line function which is presented in the equation for \$/Trip. A similar curve fit is made to represent the Block Time function with the equations shown.

Table B-11 lists input and output cost characteristics for five aircraft used in the final network competitive evaluation. The ID numbers are consistent with the seating capacities of 30 to 70. Data blanks or zeros (0) represent computations in the Design segment of the program module. For these aircraft, that segment was bypassed.

Table B-12 lists DOC data and functions derived and presented in the same manner as in Table B-10.

TABLE B-9
DATA INPUT AND PRELIMINARY COST CHARACTERISTICS FOR SEVERAL CONCEPTUAL AIRCRAFT

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PRODUCT ID	5311	5111	5211	3011	7011	5411	5611
INTRODUCTION DATE	1980	1980	1980	1980	1980	1980	1980
CRUISE MACH NUMBER	0.700	0.685	0.685	0.650	0.700	0.650	0.710
DESIGN RANGE (N.MI)	775.	563.	337.	566.	562.	564.	565.
DESIGN PAYLOAD (NO. SEATS)	50.	50.	50.	30.	70.	50.	50.
INITIAL CRUISE ALTITUDE (FT)	25000.	25000.	25000.	22000.	24000.	22000.	24000.
TAKE-OFF FIELD LENGTH (FT)							
LANDING FIELD LENGTH (FT)							
NO. OF ENGINES	2.	2.	2.	2.	2.	2.	2.
ENGINE TYPE	HIBYPASS	HIBYPASS	HIBYPASS	HIBYPASS	HIBYPASS	HIBYPASS	HIBYPASS
OPERATING PURPOSE	DOMESTIC	DOMESTIC	DOMESTIC	DOMESTIC	DOMESTIC	DOMESTIC	DOMESTIC
NO. OF FLIGHT CREW	2.	2.	2.	2.	2.	2.	2.
BREAK-POINT CAPACITY (SEATS)							
BREAK-POINT RANGE (N.MI)							
RANGE AT ZERO PAYLOAD (N.MI)							
GROSS WEIGHT (LBS)	46600.	43920.	41340.	32080.	56730.	48150.	42220.
LANDING WEIGHT (LBS)	40510.	39050.	37706.	28211.	50850.	42840.	37430.
ZERO FUEL WEIGHT (LBS)	37960.	37040.	36180.	26590.	48380.	40650.	39460.
OPERATOR WEIGHT EMPTY (LBS)	27960.	27040.	26180.	20590.	34380.	30650.	25460.
MANUFACTURER WEIGHT EMPTY (LBS)	26964.	26050.	25197.	19673.	33153.	29631.	24487.
AIRFRAME WEIGHT (LBS)	23706.	22980.	22309.	17431.	29187.	26937.	21421.
CAPACITY FUEL (LBS)	13270.	12422.	11517.	8581.	17015.	21437.	8579.
WING AREA (SQ.FT)	528.	497.	468.	363.	642.	746.	374.
TAKE-OFF THRUST PER ENGINE (LB)	8470.	7980.	7510.	5830.	10310.	8410.	7970.
FUEL CONSUMPTION (LBS/HR)	2698.	2849.	3395.	2152.	3504.	2951.	2889.
PRODUCTION RATE PER MONTH	8.	8.	8.	8.	8.	8.	8.
BREAK EVEN UNIT	400.	400.	400.	400.	400.	400.	400.
NEW DEVELOPMENT FACTOR	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PRICE TO COST RATIO	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
DEVELOPMENT COST (\$ MILLION)	118.589	111.261	105.765	82.756	139.808	114.104	112.089
UNIT PRICE (\$ MILLION)	3.299	3.125	2.982	2.409	3.847	3.256	3.105
ENGINES PRICE (\$ MILLION)	0.662	0.631	0.601	0.493	0.780	0.658	0.630
OPERATIONAL LOAD FACTOR	0.500	0.500	0.500	0.500	0.500	0.500	0.500
ANNUAL UTILIZATION (HRS)	3682.	3453.	3113.	3494.	3439.	3495.	3429.
DOLLARS PER FLIGHT	898.52	692.10	463.88	628.83	770.93	748.58	670.87
DOLLARS PER N.MILE	1.16	1.23	1.38	1.11	1.37	1.33	1.19
CENTS PER SEAT-N.MILE	2.319	2.459	2.753	3.703	1.960	2.655	2.375
BLOCK TIME (HRS)	2.257	1.709	1.071	1.798	1.678	1.800	1.658

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TABLE B-10
DIRECT OPERATING COST AT DECIMAL VARIATIONS OF DESIGN RANGE - INITIAL CONCEPTUAL AIRCRAFT

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AIRCRAFT 5311 DIRECT OPERATING COST

RANGE	(N. MILES)	77.50	155.00	232.50	310.00	387.50	465.00	542.50	620.00	697.50	775.00
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*** ATA DIRECT OPERATING COST ***
 $\$ / \text{TRIP} = (92.154) + (1.040) * \text{RANGE}$

\$ / TRIP (ACTUAL)	167.08	251.99	335.28	417.37	498.56	579.06	659.04	738.61	817.86	891.72
\$ / TRIP (CALCULATED)	172.79	253.43	334.06	414.70	495.34	575.97	656.61	737.25	817.88	898.52
\$ / HOUR (CALCULATED)	510.89	459.61	436.93	424.14	415.92	410.20	405.99	402.76	400.21	398.13
\$ / N. MILE (CALCULATED)	2.23	1.64	1.44	1.34	1.28	1.24	1.21	1.19	1.17	1.16
CENT/SEAT=N.MI. (CALCULATED)	4.459	3.270	2.874	2.675	2.557	2.477	2.421	2.378	2.345	2.319

*** ATA DUC LESS DEPRICIATION ***
 $\$ / \text{TRIP} = (71.782) + (0.898) * \text{RANGE}$

\$ / TRIP (ACTUAL)	140.02	210.38	280.52	350.50	420.36	490.12	559.81	629.45	699.04	764.07
\$ / TRIP (CALCULATED)	141.35	210.93	280.50	350.07	419.64	489.22	558.79	628.36	697.93	767.50
\$ / HOUR (CALCULATED)	417.94	382.53	366.87	358.03	352.36	348.42	345.51	343.28	341.51	340.08
\$ / N. MILE (CALCULATED)	1.82	1.36	1.21	1.13	1.08	1.05	1.03	1.01	1.00	0.99
CENT/SEAT=N.MI. (CALCULATED)	3.648	2.722	2.413	2.259	2.166	2.104	2.060	2.027	2.001	1.981

*** BLOCK TIME ***
 $\text{TB} = (0.12504) + (0.00275) * \text{RANGE}$

BLOCK TIME (ACTUAL=HRS)	0.34	0.55	0.76	0.98	1.19	1.41	1.62	1.83	2.05	2.25
BLOCK TIME ((CALCULATED=HRS)	0.34	0.55	0.76	0.98	1.19	1.40	1.62	1.83	2.04	2.26

AIRCRAFT 5111 DIRECT OPERATING COST

RANGE	(N. MILES)	56.30	112.60	168.90	225.20	281.50	337.80	394.10	450.40	506.70	563.00
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*** ATA DIRECT OPERATING COST ***
 $\$ / \text{TRIP} = (85.573) + (1.077) * \text{RANGE}$

\$ / TRIP (ACTUAL)	142.76	206.09	268.43	329.98	390.90	451.31	511.31	570.97	630.35	689.50
\$ / TRIP (CALCULATED)	146.23	206.88	267.53	328.18	388.83	449.49	510.14	570.79	631.44	692.10
\$ / HOUR (CALCULATED)	522.53	471.61	447.76	433.93	424.90	418.54	413.82	410.17	407.28	404.92
\$ / N. MILE (CALCULATED)	2.60	1.84	1.58	1.46	1.38	1.33	1.29	1.27	1.25	1.23
CENT/SEAT=N.MI. (CALCULATED)	5.194	3.675	3.168	2.915	2.763	2.661	2.589	2.535	2.492	2.459

*** ATA DUC LESS DEPRICIATION ***
 $\$ / \text{TRIP} = (69.236) + (0.928) * \text{RANGE}$

\$ / TRIP (ACTUAL)	121.03	173.66	226.15	278.54	330.84	383.07	435.25	487.38	539.47	591.53
\$ / TRIP (CALCULATED)	121.50	173.77	226.03	278.30	330.56	382.83	435.09	487.36	539.62	591.89
\$ / HOUR (CALCULATED)	434.18	396.13	378.30	367.97	361.22	356.47	352.94	350.22	348.05	346.29
\$ / N. MILE (CALCULATED)	2.16	1.54	1.34	1.24	1.17	1.13	1.10	1.08	1.06	1.05
CENT/SEAT=N.MI. (CALCULATED)	4.316	3.086	2.677	2.472	2.349	2.267	2.208	2.164	2.130	2.103

*** BLOCK TIME ***
 $\text{TB} = (0.12102) + (0.00282) * \text{RANGE}$

BLOCK TIME (ACTUAL=HRS)	0.28	0.44	0.60	0.76	0.92	1.07	1.23	1.39	1.55	1.71
BLOCK TIME ((CALCULATED=HRS)	0.28	0.44	0.60	0.76	0.92	1.07	1.23	1.39	1.55	1.71

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AIRCRAFT 5211 DIRECT OPERATING COST

RANGE	(N. MILES)	33.70	67.40	101.10	134.80	168.50	202.20	235.90	269.60	303.30	337.00
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*** ATA DIRECT OPERATING COST ***
 $\$ / \text{TRIP} = (81.725) + (1.134) * \text{RANGE}$

\$ / TRIP (ACTUAL)	118.22	157.70	196.70	235.47	273.87	312.01	349.90	387.60	425.10	462.45
\$ / TRIP (CALCULATED)	119.94	158.16	196.37	234.59	272.80	311.02	349.23	387.45	425.66	463.88
\$ / HOUR (CALCULATED)	558.11	510.23	484.82	469.07	458.36	450.59	444.71	440.09	436.38	433.33
\$ / N. MILE (CALCULATED)	3.56	2.35	1.94	1.74	1.62	1.54	1.48	1.44	1.40	1.38
CENT/SEAT=N.MI. (CALCULATED)	7.118	4.693	3.885	3.481	3.238	3.076	2.961	2.874	2.807	2.753

*** ATA DUC LESS DEPRICIATION ***
 $\$ / \text{TRIP} = (69.343) + (0.974) * \text{RANGE}$

\$ / TRIP (ACTUAL)	101.94	134.95	167.90	200.81	233.67	266.49	299.28	332.05	364.79	397.50
\$ / TRIP (CALCULATED)	102.18	135.01	167.85	200.69	233.52	266.36	299.19	332.03	364.86	397.70
\$ / HOUR (CALCULATED)	475.46	435.57	414.40	401.29	392.36	385.89	380.99	377.14	374.05	371.51
\$ / N. MILE (CALCULATED)	3.03	2.00	1.66	1.49	1.39	1.32	1.27	1.23	1.20	1.18
CENT/SEAT=N.MI. (CALCULATED)	6.064	4.006	3.320	2.978	2.772	2.635	2.537	2.463	2.406	2.360

*** BLOCK TIME ***
 $\text{TB} = (0.11984) + (0.00282) * \text{RANGE}$

BLOCK TIME (ACTUAL=HRS)	0.21	0.31	0.41	0.50	0.60	0.69	0.79	0.88	0.98	1.07
BLOCK TIME ((CALCULATED=HRS)	0.21	0.31	0.41	0.50	0.60	0.69	0.79	0.88	0.98	1.07

AIRCRAFT 3011 DIRECT OPERATING COST

RANGE	(N. MILES)	56.60	113.20	169.80	226.40	283.00	339.60	396.20	452.80	509.40	566.00
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*** ATA DIRECT OPERATING COST ***
 $\$ / \text{TRIP} = (71.233) + (0.985) * \text{RANGE}$

\$ / TRIP (ACTUAL)	124.12	182.12	239.27	295.76	351.73	407.29	462.50	517.45	572.17	626.71
\$ / TRIP (CALCULATED)	126.99	182.75	238.51	294.27	350.03	405.79	461.55	517.31	573.07	628.83
\$ / HOUR (CALCULATED)	447.47	404.26	384.49	373.16	365.81	360.66	356.85	353.92	351.60	349.70
\$ / N. MILE (CALCULATED)	2.24	1.61	1.40	1.30	1.24	1.19	1.16	1.14	1.12	1.11
CENT/SEAT=N.MI. (CALCULATED)	7.479	5.381	4.682	4.333	4.123	3.983	3.883	3.808	3.750	3.703

*** ATA DUC LESS DEPRICIATION ***
 $\$ / \text{TRIP} = (58.555) + (0.866) * \text{RANGE}$

\$ / TRIP (ACTUAL)	107.16	156.45	205.64	254.73	303.75	352.71	401.63	450.51	499.36	548.19
\$ / TRIP (CALCULATED)	107.55	156.54	205.53	254.53	303.52	352.51	401.50	450.50	499.49	548.48
\$ / HOUR (CALCULATED)	378.96	346.28	331.33	322.76	317.20	313.31	310.43	308.21	306.45	305.02
\$ / N. MILE (CALCULATED)	1.90	1.38	1.21	1.12	1.07	1.04	1.01	0.99	0.98	0.97
CENT/SEAT=N.MI. (CALCULATED)	6.334	4.610	4.035	3.747	3.575	3.460	3.378	3.316	3.268	3.230

*** BLOCK TIME ***
 $\text{TB} = (0.11554) + (0.00297) * \text{RANGE}$

BLOCK TIME (ACTUAL=HRS)	0.28	0.45	0.62	0.79	0.96	1.13	1.29	1.46	1.63	1.80
BLOCK TIME ((CALCULATED=HRS)	0.28	0.45	0.62	0.79	0.96	1.13	1.29	1.46	1.63	1.80

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AIRCRAFT 7011 DIRECT OPERATING COST

RANGE	(N. MILES)	56.20	112.40	168.60	224.80	281.00	337.20	393.40	449.60	505.80	562.00
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*** ATA DIRECT OPERATING COST ***

			$\$ / \text{TRIP} = (100.740) + (1.193) * \text{RANGE}$								
\$ / TRIP	(ACTUAL)	163.64	233.83	302.86	370.95	438.30	505.04	571.28	637.11	702.61	767.82
\$ / TRIP	(CALCULATED)	167.76	234.78	301.80	368.81	435.83	502.85	569.87	636.89	703.91	770.93
\$ / HOUR	(CALCULATED)	594.98	537.13	509.59	493.48	482.91	475.44	469.88	465.58	462.16	459.37
\$ / N. MILE	(CALCULATED)	2.99	2.09	1.79	1.64	1.55	1.49	1.45	1.42	1.39	1.37
CENT/SEAT=N.MI. (CALCULATED)		4.264	2.984	2.557	2.344	2.216	2.130	2.069	2.024	1.988	1.960

*** ATA DUC LESS DEPRICIATION ***

			$\$ / \text{TRIP} = (80.376) + (1.012) * \text{RANGE}$								
\$ / TRIP	(ACTUAL)	136.71	194.04	251.21	308.26	365.20	422.06	478.85	535.59	592.28	648.93
\$ / TRIP	(CALCULATED)	137.27	194.17	251.07	307.97	364.86	421.76	478.66	535.55	592.45	649.35
\$ / HOUR	(CALCULATED)	486.86	444.23	423.93	412.06	404.27	398.77	394.67	391.80	388.98	386.93
\$ / N. MILE	(CALCULATED)	2.44	1.73	1.49	1.37	1.30	1.25	1.22	1.19	1.17	1.16
CENT/SEAT=N.MI. (CALCULATED)		3.489	2.468	2.127	1.957	1.855	1.787	1.738	1.702	1.673	1.651

*** BLOCK TIME ***

			$\text{TB} = (0.12681) + (0.00276) * \text{RANGE}$								
BLOCK TIME	(ACTUAL=HRS)	0.28	0.44	0.59	0.75	0.90	1.06	1.21	1.37	1.52	1.68
BLOCK TIME	(CALCULATED=HRS)	0.28	0.44	0.59	0.75	0.90	1.06	1.21	1.37	1.52	1.68

AIRCRAFT 5411 DIRECT OPERATING COST

RANGE	(N. MILES)	56.40	112.80	169.20	225.60	282.00	338.40	394.80	451.20	507.60	564.00
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*** ATA DIRECT OPERATING COST ***

			$\$ / \text{TRIP} = (89.806) + (1.168) * \text{RANGE}$								
\$ / TRIP	(ACTUAL)	151.86	220.71	288.44	355.30	421.46	487.06	552.21	617.01	681.50	745.75
\$ / TRIP	(CALCULATED)	155.68	221.56	287.44	353.31	419.19	485.07	550.94	616.82	682.70	748.58
\$ / HOUR	(CALCULATED)	535.69	483.45	459.19	445.19	436.07	429.65	424.90	421.24	418.32	415.96
\$ / N. MILE	(CALCULATED)	2.76	1.96	1.70	1.57	1.49	1.43	1.40	1.37	1.34	1.33
CENT/SEAT=N.MI. (CALCULATED)		5.521	3.928	3.398	3.132	2.973	2.867	2.791	2.734	2.690	2.655

*** ATA DUC LESS DEPRICIATION ***

			$\$ / \text{TRIP} = (72.178) + (1.007) * \text{RANGE}$								
\$ / TRIP	(ACTUAL)	128.43	185.62	242.65	299.56	356.37	413.11	469.79	526.42	583.01	639.57
\$ / TRIP	(CALCULATED)	128.95	185.73	242.51	299.29	356.06	412.84	469.62	526.40	583.17	639.95
\$ / HOUR	(CALCULATED)	443.72	405.27	387.42	377.11	370.40	365.68	362.18	359.48	357.34	355.60
\$ / N. MILE	(CALCULATED)	2.29	1.65	1.43	1.33	1.26	1.22	1.19	1.17	1.15	1.13
CENT/SEAT=N.MI. (CALCULATED)		4.573	3.293	2.867	2.653	2.525	2.440	2.379	2.333	2.298	2.269

*** BLOCK TIME ***

			$\text{TB} = (0.12295) + (0.00297) * \text{RANGE}$								
BLOCK TIME	(ACTUAL=HRS)	0.29	0.46	0.63	0.79	0.96	1.13	1.30	1.46	1.63	1.80
BLOCK TIME	(CALCULATED=HRS)	0.29	0.46	0.63	0.79	0.96	1.13	1.30	1.46	1.63	1.80

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AIRCRAFT 5611 DIRECT OPERATING COST

RANGE	(N. MILES)	56,50	113,00	169,50	224,00	282,50	339,00	395,50	452,00	508,50	565,00
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*** ATA DIRECT OPERATING COST ***

$$\$/\text{TRIP} = (84.536) + (1.038) * \text{RANGE}$$

\$ / TRIP (ACTUAL)	139.85	201.04	261.29	320.79	379.69	438.10	496.11	553.79	611.19	668.37
\$ / TRIP (CALCULATED)	143.17	201.80	260.44	319.07	377.70	436.34	494.97	553.60	612.24	670.87
\$ / HOUR (CALCULATED)	522.49	471.74	447.82	435.91	424.81	418.40	413.63	409.95	407.02	404.63
\$ / N. MILE (CALCULATED)	2.53	1.79	1.54	1.41	1.34	1.29	1.25	1.22	1.20	1.19
CENT/SEAT=N.MI. (CALCULATED)	5.068	3.572	3.073	2.824	2.674	2.574	2.503	2.450	2.408	2.375

*** ATA DUC LESS DEPRICIATION ***

$$\$/\text{TRIP} = (68.620) + (0.894) * \text{RANGE}$$

\$ / TRIP (ACTUAL)	118.67	169.52	220.24	270.86	321.40	371.87	422.29	472.66	522.99	573.29
\$ / TRIP (CALCULATED)	119.12	169.62	220.12	270.63	321.13	371.63	422.13	472.63	523.13	573.63
\$ / HOUR (CALCULATED)	434.72	396.51	378.51	368.03	361.18	356.35	352.76	349.99	347.78	345.99
\$ / N. MILE (CALCULATED)	2.11	1.50	1.30	1.20	1.14	1.10	1.07	1.05	1.03	1.02
CENT/SEAT=N.MI. (CALCULATED)	4.217	3.002	2.597	2.395	2.273	2.192	2.135	2.091	2.058	2.031

*** BLOCK TIME ***

$$\text{TB} = (0.12024) + (0.00272) * \text{RANGE}$$

BLOCK TIME (ACTUAL=HRS)	0.27	0.43	0.58	0.74	0.89	1.04	1.20	1.35	1.50	1.66
BLOCK TIME ((CALCULATED=HRS)	0.27	0.43	0.58	0.74	0.89	1.04	1.20	1.35	1.50	1.66

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TABLE B-11
FINAL DESIGN BASEPOINT AND DERIVATIVE AIRCRAFT CHARACTERISTICS

11/14/74 9.16.07

PRODUCT ID	3212	4212	5212	6212	7212
INTRODUCTION DATE	1980	1980	1980	1980	1980
CRUISE MACH NUMBER	0.750	0.750	0.750	0.750	0.750
DESIGN RANGE (N.MI)	850.	850.	850.	850.	850.
DESIGN PAYLOAD (NO. SEATS)	30.	40.	50.	60.	70.
INITIAL CRUISE ALTITUDE (FT)	0.	0.	0.	0.	0.
TAKE-OFF FIELD LENGTH (FT)	0.	0.	0.	0.	0.
LANDING FIELD LENGTH (FT)	0.	0.	0.	0.	0.
NO. OF ENGINES	2.	2.	2.	2.	2.
ENGINE TYPE	HIBYPASS	HIBYPASS	HIBYPASS	HIBYPASS	HIBYPASS
OPERATING PURPOSE	DOMESTIC	DOMESTIC	DOMESTIC	DOMESTIC	DOMESTIC
NO. OF FLIGHT CREW	2.	2.	2.	2.	2.
BREAK-POINT CAPACITY (SEATS)	0.	0.	0.	0.	0.
BREAK-POINT RANGE (N.MI)	0.	0.	0.	0.	0.
RANGE AT ZERO PAYLOAD (N.MI)	0.	0.	0.	0.	0.
GROSS WEIGHT (LBS)	34370.	40597.	46850.	53560.	60306.
LANDING WEIGHT (LBS)	29003.	34533.	40090.	46104.	52147.
ZERO FUEL WEIGHT (LBS)	27125.	32429.	37760.	43508.	49283.
OPERATOR WEIGHT EMPTY (LBS)	21125.	24429.	27760.	31508.	35283.
MANUFACTURER WEIGHT EMPTY (LBS)	20147.	23429.	26685.	30314.	33943.
AIRFRAME WEIGHT (LBS)	17687.	20514.	23315.	0.	29589.
CAPACITY FUEL (LBS)	0.	0.	0.	0.	0.
WING AREA (SQ.FT)	339.	402.	464.	532.	600.
TAKE-OFF THRUST PER ENGINE (LB)	6402.	7586.	8770.	10050.	11331.
FUEL CONSUMPTION (LBS/HR)	2333.	2633.	2932.	3229.	3529.
PRODUCTION RATE PER MONTH	0.	0.	8.	0.	0.
BREAK EVEN UNIT	0.	0.	400.	0.	0.
NEW DEVELOPMENT FACTOR	1.00	1.00	1.00	1.00	1.00
PRICE TO COST RATIO	0.0	0.0	1.0000	0.0	0.0
DEVELOPMENT COST (\$ MILLION)	80.873	94.786	122.042	122.614	136.527
UNIT PRICE (\$ MILLION)	2.372	2.726	3.077	3.585	3.788
ENGINES PRICE (\$ MILLION)	0.532	0.606	0.682	0.762	0.842
OPERATIONAL LOAD FACTOR	0.0	0.0	0.500	0.0	0.0
ANNUAL UTILIZATION (HRS)	2945.	2945.	2946.	2947.	2948.
DOLLARS PER FLIGHT	834.72	896.74	958.60	959.94	1086.01
DOLLARS PER N.MILE	0.98	1.05	1.13	1.13	1.28
CENTS PER SEAT-N.MILE	3.273	2.637	2.256	1.882	1.825
BLOCK TIME (HRS)	2.300	2.303	2.306	2.309	2.312

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TABLE 8-12
DIRECT OPERATING COSTS OF BASEPOINT AND DERIVATIVE AIRCRAFT

11/14/74 9.16.07

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AIRCRAFT 3212 DIRECT OPERATING COST

RANGE	(N. MILES)	85.00	170.00	255.00	340.00	425.00	510.00	595.00	680.00	765.00	850.00
*** ATA DIRECT OPERATING COST ***											
$\$ / \text{TRIP} = (73.690) + (0.895) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		145.52	224.30	302.42	379.92	456.84	533.21	609.07	684.45	759.39	827.45
\$ / TRIP (CALCULATED)		149.79	225.90	302.00	378.10	454.20	530.31	606.41	682.51	758.62	834.72
\$ / HOUR (CALCULATED)		442.68	406.04	390.03	381.05	375.30	371.31	368.38	366.13	364.35	362.91
\$ / N. MILE (CALCULATED)		1.76	1.33	1.18	1.11	1.07	1.04	1.02	1.00	0.99	0.98
CENT/SEAT=N.MI. (CALCULATED)		5.874	4.429	3.948	3.707	3.562	3.466	3.397	3.346	3.306	3.273
*** ATA DOC LESS DEPRICIATION ***											
$\$ / \text{TRIP} = (60.642) + (0.770) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		124.77	190.81	256.75	322.62	388.40	454.11	519.74	585.32	650.83	710.61
\$ / TRIP (CALCULATED)		126.05	191.46	256.87	322.28	387.69	453.10	518.51	583.92	649.33	714.74
\$ / HOUR (CALCULATED)		372.52	344.14	331.74	324.79	320.34	317.25	314.98	313.24	311.86	310.75
\$ / N. MILE (CALCULATED)		1.48	1.13	1.01	0.95	0.91	0.89	0.87	0.86	0.85	0.84
CENT/SEAT=N.MI. (CALCULATED)		4.943	3.754	3.358	3.160	3.041	2.961	2.905	2.862	2.829	2.803
*** BLOCK TIME ***											
$\text{TB} = (0.12041) + (0.00256) * \text{RANGE}$											
BLOCK TIME (ACTUAL=HRS)		0.34	0.55	0.77	0.99	1.21	1.43	1.65	1.87	2.09	2.29
BLOCK TIME ((CALCULATED=HRS)		0.34	0.56	0.77	0.99	1.21	1.43	1.65	1.86	2.08	2.30

AIRCRAFT 4212 DIRECT OPERATING COST

RANGE	(N. MILES)	85.00	170.00	255.00	340.00	425.00	510.00	595.00	680.00	765.00	850.00
*** ATA DIRECT OPERATING COST ***											
$\$ / \text{TRIP} = (81.140) + (0.960) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		157.86	242.48	326.32	409.46	491.93	573.77	655.02	735.73	815.92	888.72
\$ / TRIP (CALCULATED)		162.70	244.26	325.82	407.38	488.94	570.50	652.06	733.62	815.18	896.74
\$ / HOUR (CALCULATED)		476.76	436.78	419.23	409.36	403.04	398.65	395.42	392.94	390.98	389.39
\$ / N. MILE (CALCULATED)		1.91	1.44	1.28	1.20	1.15	1.12	1.10	1.08	1.07	1.05
CENT/SEAT=N.MI. (CALCULATED)		4.785	3.592	3.194	2.995	2.876	2.797	2.740	2.697	2.664	2.637
*** ATA DOC LESS DEPRICIATION ***											
$\$ / \text{TRIP} = (65.942) + (0.815) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		133.82	203.79	273.66	343.43	413.11	482.70	552.21	621.65	691.02	754.31
\$ / TRIP (CALCULATED)		135.22	204.50	273.78	343.05	412.33	481.61	550.89	620.16	689.44	758.72
\$ / HOUR (CALCULATED)		396.23	365.68	352.26	344.72	339.89	336.53	334.06	332.17	330.67	329.46
\$ / N. MILE (CALCULATED)		1.59	1.20	1.07	1.01	0.97	0.94	0.93	0.91	0.90	0.89
CENT/SEAT=N.MI. (CALCULATED)		3.977	3.007	2.684	2.522	2.425	2.361	2.315	2.280	2.253	2.232
*** BLOCK TIME ***											
$\text{TB} = (0.12340) + (0.00256) * \text{RANGE}$											
BLOCK TIME (ACTUAL=HRS)		0.34	0.56	0.78	1.00	1.21	1.43	1.65	1.87	2.09	2.29
BLOCK TIME ((CALCULATED=HRS)		0.34	0.56	0.78	1.00	1.21	1.43	1.65	1.87	2.08	2.30

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AIRCRAFT 5212 DIRECT OPERATING COST

RANGE	(N. MILES)	85.00	170.00	255.00	340.00	425.00	510.00	595.00	680.00	765.00	850.00
*** ATA DIRECT OPERATING COST ***											
$\$ / \text{TRIP} = (88.660) + (1.023) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		170.26	260.68	350.23	438.97	526.97	614.26	700.88	786.89	872.31	949.84
\$ / TRIP (CALCULATED)		175.65	262.65	349.64	436.64	523.63	610.63	697.62	784.62	871.61	958.60
\$ / HOUR (CALCULATED)		510.43	467.27	448.23	437.50	430.62	425.83	422.31	419.61	417.47	415.73
\$ / N. MILE (CALCULATED)		2.07	1.54	1.37	1.28	1.23	1.20	1.17	1.15	1.14	1.13
CENT/SEAT=N.MI. (CALCULATED)		4.133	3.090	2.742	2.568	2.464	2.395	2.345	2.308	2.279	2.256
*** ATA DOC LESS DEPRICIATION ***											
$\$ / \text{TRIP} = (71.279) + (0.860) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		142.91	216.80	290.58	364.25	437.82	511.29	584.67	657.96	731.18	797.98
\$ / TRIP (CALCULATED)		144.42	217.56	290.70	363.83	436.97	510.11	583.25	656.39	729.53	802.67
\$ / HOUR (CALCULATED)		419.66	387.05	372.66	364.55	359.36	355.74	353.07	351.03	349.42	348.11
\$ / N. MILE (CALCULATED)		1.70	1.28	1.14	1.07	1.03	1.00	0.98	0.97	0.95	0.94
CENT/SEAT=N.MI. (CALCULATED)		3.398	2.559	2.280	2.140	2.056	2.000	1.961	1.931	1.907	1.889
*** BLOCK TIME ***											
$\text{TB} = (0.12616) + (0.00256) * \text{RANGE}$											
BLOCK TIME (ACTUAL=HRS)		0.34	0.56	0.78	1.00	1.22	1.44	1.66	1.87	2.09	2.29
BLOCK TIME ((CALCULATED=HRS)		0.34	0.56	0.78	1.00	1.22	1.43	1.65	1.87	2.09	2.31

AIRCRAFT 6212 DIRECT OPERATING COST

RANGE	(N. MILES)	85.00	170.00	255.00	340.00	425.00	510.00	595.00	680.00	765.00	850.00
*** ATA DIRECT OPERATING COST ***											
$\$ / \text{TRIP} = (91.923) + (1.021) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		172.63	263.34	353.05	441.83	529.72	616.80	703.11	788.69	873.59	950.57
\$ / TRIP (CALCULATED)		178.72	265.53	352.33	439.13	525.93	612.73	699.53	786.34	873.14	959.94
\$ / HOUR (CALCULATED)		514.81	469.85	449.92	438.67	431.44	426.40	422.69	419.85	417.59	415.77
\$ / N. MILE (CALCULATED)		2.10	1.56	1.38	1.29	1.24	1.20	1.18	1.16	1.14	1.13
CENT/SEAT=N.MI. (CALCULATED)		3.504	2.603	2.303	2.153	2.062	2.002	1.959	1.927	1.902	1.882
*** ATA DOC LESS DEPRICIATION ***											
$\$ / \text{TRIP} = (71.395) + (0.831) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		140.49	211.97	283.31	354.53	425.62	496.61	567.49	638.27	708.96	773.44
\$ / TRIP (CALCULATED)		142.06	212.73	283.40	354.07	424.73	495.40	566.07	636.74	707.41	778.07
\$ / HOUR (CALCULATED)		409.21	376.43	361.90	353.69	348.42	344.75	342.05	339.97	338.33	337.00
\$ / N. MILE (CALCULATED)		1.67	1.25	1.11	1.04	1.00	0.97	0.95	0.94	0.92	0.92
CENT/SEAT=N.MI. (CALCULATED)		2.786	2.086	1.852	1.736	1.666	1.619	1.586	1.561	1.541	1.526
*** BLOCK TIME ***											
$\text{TB} = (0.12920) + (0.00256) * \text{RANGE}$											
BLOCK TIME (ACTUAL=HRS)		0.34	0.56	0.78	1.00	1.22	1.44	1.66	1.88	2.10	2.30
BLOCK TIME ((CALCULATED=HRS)		0.35	0.57	0.78	1.00	1.22	1.44	1.65	1.87	2.09	2.31

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AIRCRAFT 7212 DIRECT OPERATING COST

RANGE	(N. MILES)	85.00	170.00	255.00	340.00	425.00	510.00	595.00	680.00	765.00	850.00
*** ATA DIRECT OPERATING COST ***											
$\$ / \text{TRIP} = (104.491) + (1.155) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		196.13	298.44	399.69	499.96	599.30	697.77	795.43	892.33	988.51	1075.75
\$ / TRIP (CALCULATED)		202.64	300.79	398.95	497.10	595.25	693.40	791.56	889.71	987.86	1086.01
\$ / HOUR (CALCULATED)		578.69	529.44	507.50	495.09	487.10	481.53	477.43	474.28	471.78	469.76
\$ / N. MILE (CALCULATED)		2.38	1.77	1.56	1.46	1.40	1.36	1.33	1.31	1.29	1.28
CENT/SEAT-N.MI. (CALCULATED)		3.406	2.528	2.235	2.089	2.001	1.942	1.900	1.869	1.845	1.825
*** ATA DOC LESS DEPRICIATION ***											
$\$ / \text{TRIP} = (82.505) + (0.954) * \text{RANGE}$											
\$ / TRIP (ACTUAL)		161.88	243.88	325.74	407.46	489.06	570.54	651.92	733.18	814.35	888.40
\$ / TRIP (CALCULATED)		163.62	244.74	325.85	406.97	488.08	569.20	650.31	731.43	812.54	893.66
\$ / HOUR (CALCULATED)		467.25	430.77	414.51	405.32	399.40	395.28	392.24	389.90	388.06	386.56
\$ / N. MILE (CALCULATED)		1.92	1.44	1.28	1.20	1.15	1.12	1.09	1.08	1.06	1.05
CENT/SEAT-N.MI. (CALCULATED)		2.750	2.057	1.825	1.710	1.641	1.594	1.561	1.537	1.517	1.502
*** BLOCK TIME ***											
$\text{TB} = (0.13221) + (0.00256) * \text{RANGE}$											
BLOCK TIME (ACTUAL-HRS)		0.35	0.57	0.79	1.00	1.22	1.44	1.66	1.88	2.10	2.30
BLOCK TIME (CALCULATED-HRS)		0.35	0.57	0.79	1.00	1.22	1.44	1.66	1.88	2.09	2.31

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B.5 NONCOMPETITIVE OPERATIONAL SIMULATION WITH CONCEPTUAL AIRCRAFT

Table B -13 is a sample of printout from the computerized operational simulation model. This model was used to evaluate performance of all of the initial parametric and conceptual variations of the initial aircraft. Shown in the table are the 1980 Annual Traffic Statistics divided into the six regions. These are labeled in the first part of the table as Service Class. The minimum trip per day is the 1972 schedule used as a base in this part of the study. Other pertinent data are Passengers (demand for seats per route), RPM, R-Bar (the average stage length in each traffic region) and minimum trips in millions, which is the annual total in the mission model.

The 1980 fleet characteristics are shown in the next two lines of data. These data are output from the simulation program. There is some overlap in data which is of no consequence in the analysis, i.e., Number of Units, Revenue Passenger Miles, and Average Range.

TABLE B-13

MISSION MODEL DEMAND AND FLEET STATISTICS

06/06/74 20.43.27

ED 119, RR 50, CS 0, PC 2,

1980 ANNUAL TRAFFIC STATISTICS

SERVICE CLASS		PASSENGERS	SEATS	TRIPS	RPM	SEAT-MILES	TRIP-MILES	PAX /	SEAT/	R-BAR	R-BAR	AIRPORT	MIN.
TRIPS/DAY		(MILL)	(MILL)	(MILL)	(CPL)	(BILL)	(BILL)	TRIP	TRIP	SEATS	TRIPS	PAIRS	TRIPS
MIN MAX										(STATUTE	MILES)		(MILL)
1.4	- 61.4	30.417	62.075	6.512	5.622	11.474	1.037	5.4	11.1	185.	159.	902.	0.651
6.7	- 68.5	18.994	38.371	3.873	2.945	5.950	0.552	5.5	11.2	155.	137.	613.	0.387
9.0	- 43.6	5.308	17.899	2.007	1.897	3.648	0.334	5.7	10.9	204.	167.	343.	0.201
1.4	- 23.6	9.026	18.882	1.675	1.859	3.889	0.302	6.2	12.9	206.	180.	322.	0.168
8.6	- 29.3	11.475	23.418	2.613	1.911	3.901	0.395	4.8	9.9	167.	151.	433.	0.261
4.9	- 25.0	5.816	8.556	0.482	1.334	1.962	0.108	12.4	18.2	229.	223.	111.	0.048
TOTAL													
4.9	- 61.4	85.026	169.201	17.162	19.568	30.822	2.738	5.7	11.4	182.	158.	2724.	1.716

06/06/74 20.43.27

ED 119, RR 50, CS 0, PC 2, PAGE 14

1980

MAXIMUM PROFIT FLEET CHARACTERISTICS SUMMARY

ID	TRIPS	TRIP-MILES	REVENUE	BLOCK	NO.OF	UTILIZATION	FUEL	REVENUE	SEAT-MILES	LOAD	AVE	PRODUCTIVITY
	(MIL)	(MILL)	FOURS	SPEED	UNITS	(HRS/AC/YR)	MIL-TONS	PAX-MILES	(BILL)	FACTOR	RANGE	RPM/AC MIL
5111	3.414	592.5	1864562.0	317.8	656.	2842.	2.656	14.697	29.624	0.490	175.	22.40
TOTAL	3.414	592.5	1864562.0	317.8	656.	2842.	2.656	14.697	29.624	0.490	175.	22.40

SUMMARY REPORT BASED ON MAXIMUM PROFIT

CANDIDATE	TRANSPORT	FLEET	PRICE	ANNUAL REVENUE	ANNUAL PROFIT	RETURN ON	PASSENGER-MILES	PASSENGERS	RANGE
TRANSPORT	UNITS	PCNT	\$MIL,PCNT	\$MIL,PCNT	\$MIL,PCNT	INVEST	MIL,PCNT	TRN'D,PCNT	BAR
5111	656.10	100.0	2090.607	100.0	2090.828	100.0	31.766	100.0	175.
TOTAL	656.10	100.0	2090.607	100.0	2090.828	100.0	31.766	100.0	175.

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B.6 COMPETITIVE OPERATIONAL SIMULATION

The competitive evaluation of contemporary and medium density derivative aircraft was conducted with a revised network and mission model. Data representative of this analysis are shown in the following three tables for 1980, 1985, and 1990. Table B-14 lists the 1980 traffic statistics from the mission model and summaries of fleet statistics. The mission model has two parts or service classes. Service Class 1 is that major portion of the model which has growth rates associated with the RPM demanded. Service Class 2 is the zero growth network equivalent to commuter or low density traffic. The fleet composition which provides the requisite trips and RPM is shown in the next two series of data. The aircraft ID identifies the aircraft and the performance it generates. The aircraft are identified as follows:

3212	30 seat Basepoint Derivative
4212	40 seat Basepoint Derivative
5212	50 seat Basepoint
6212	60 seat Basepoint Derivative
9016	B737/DC-9 type

Detailed and summary fleet statistics are listed for the fleet and each aircraft.

Tables B-15 and B-16 are the same as the table for 1980, but show fleet data for 1985 and 1990 respectively.

TABLE B-14

1980 MISSION MODEL DEMAND AND FLEET STATISTICS

12/17/74 13.16.55

1980 ANNUAL TRAFFIC STATISTICS

SERVICE CLASS	PASSENGERS (MILL)	SEATS (MILL)	TRIPS (MILL)	RPM (BIL)	SEAT-MILES (BILL)	TRIP-MILES (BILL)	PAX / TRIP	SEAT/ TRIP	R-BAR SEATS (STATUTE MILES)	R-BAR TRIPS (MILES)	LOAD FACTOR	MIN. TRIPS (MILL)
1	70.474	134.236	22.614	12.997	24.755	0.250	52.0	99.0	184.	157.	52.50	1,594
2	3.535	5.894	3.439	0.310	0.517	0.031	10.2	16.9	88.	89.	59.98	0,344
TOTAL												
2	74.009	140.130	26.054	13.307	25.272	0.281	47.4	90.1	180.	145.	52.65	1,938

1980

MAXIMUM PROFIT FLEET CHARACTERISTICS SUMMARY

ID	TRIPS (MIL)	TRIP-MILES (MILL)	REVENUE HOURS	BLOCK SPEED (MPH)	NO.OF UNITS	UTILIZATION (HRS/AC/YR)	FUEL MIL-TONS	REVENUE PAX-MILES	SEAT-MILES (BILL)	LOAD FACTOR	AVE RANGE	PRODUCTIVITY RPM/AC MIL
3212	0.579	49.7	180221.5	275.9	91.	1978.	0.210	0.544	1.492	0.365	85.	5.97
4212	0.030	2.5	9329.6	271.3	5.	1995.	0.012	0.049	0.101	0.484	84.	10.48
6212	0.233	24.7	84984.7	290.4	42.	2008.	0.137	0.738	1.481	0.498	106.	17.43
9016	1.310	252.6	797246.3	316.9	299.	2666.	2.471	11,976	25,265	0.474	200.	40.05
TOTAL	2.152	329.6	1071782.0	307.5	437.	2452.	2.831	13,307	28,339	0.470	180.	30.44

SUMMARY REPORT BASED ON MAXIMUM PROFIT

CANDIDATE TRANSPORT	TRANSPORT UNITS	FLEET PCNT	FLEET SMIL, PCNT	PRICE	ANNUAL REVENUE SMIL, PCNT	ANNUAL PROFIT SMIL, PCNT	RETURN ON INVEST	PASSENGER-MILES MIL, PCNT	PASSENGERS THN+D, PCNT	RANGE BAR
3212	91.12	20.8	216.143	10.8	95.122	6.2	=41.339	=36.2	=19.13	544. 4.1
4212	4.68	1.1	12.750	0.6	8.588	0.6	=0.940	=0.8	=7.37	49. 0.4
6212	42.33	9.7	151.755	7.6	113.487	7.4	4.515	4.0	2.98	738. 5.5
9016	299.00	68.4	1614.600	80.9	1315.707	85.8	151.855	133.1	9.41	11976. 90.0
TOTAL	437.13	100.0	1995.248	100.0	1532.903	100.0	114.091	100.0	5.72	13307. 100.0

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B-84

TABLE B-15

1985 MISSION MODEL DEMAND AND FLEET STATISTICS

12/17/74 13,16.55

1985 ANNUAL TRAFFIC STATISTICS												
SERVICE CLASS	PASSENGERS (MILL)	SEATS (MILL)	TRIPS (MILL)	RPM (BIL)	SEAT-MILES (BILL)	TRIP-MILES (BILL)	PAX / TRIP	SEAT/ TRIP	R-BAR SEATS (STATUTE MILES)	R-BAR TRIPS (MILES)	LOAD FACTOR	MIN. TRIPS (MILL)
1	89.944	171.323	28.862	16.587	31.595	0.250	66.3	126.4	184.	157.	52.50	1.594
2	3.535	5.894	3.439	0.310	0.517	0.031	10.2	16.9	88.	89.	59.98	0.344
TOTAL												
2	93.479	177.216	32.302	16.897	32.112	0.281	60.2	114.4	181.	145.	52.62	1.938

1985

MAXIMUM PROFIT FLEET CHARACTERISTICS SUMMARY												
ID	TRIPS (MIL)	TRIP-MILES (MILL)	REVENUE HOURS	BLOCK SPEED (MPH)	NO. OF UNITS	UTILIZATION (HRS/AC/YR)	FUEL MIL-TONS	REVENUE PAX-MILES	SEAT-MILES (BILL)	LOAD FACTOR	AVE RANGE	PRODUCTIVITY RPM/AC MIL
3212	0.463	41.9	148840.4	281.2	75.	1986.	0.174	0.471	1.256	0.375	90.	6.28
4212	0.115	7.9	31800.1	248.4	16.	1943.	0.042	0.138	0.316	0.436	69.	8.42
5212	0.030	2.5	9415.5	268.8	5.	1996.	0.014	0.063	0.127	0.494	84.	13.26
9016	1.779	332.0	1059269.0	313.5	404.	2622.	3.284	16.226	33.204	0.489	190.	40.16
TOTAL	2.388	384.3	1249325.0	307.6	500.	2498.	3.513	16.897	34.902	0.484	181.	33.79

SUMMARY REPORT BASED ON MAXIMUM PROFIT

CANDIDATE TRANSPORT	TRANSPORT UNITS	FLEET PCNT	FLEET \$MIL, PCNT	PRICE PCNT	ANNUAL REVENUE \$MIL, PCNT	ANNUAL PROFIT \$MIL, PCNT	RETURN ON INVEST	PASSENGER-MILES MIL, PCNT	PASSENGERS THN+D, PCNT	RANGE BAR
3212	74.95	15.0	177.793	7.4	79.313	4.1	-33.365	-17.1	-18.77	471. 2.8
4212	16.37	3.3	44.617	1.8	27.428	1.4	-4.436	-2.3	-9.94	138. 0.8
5212	4.72	0.9	14.515	0.6	10.961	0.6	-0.308	-0.2	-2.12	63. 0.4
9016	404.00	80.8	2181.600	90.2	1824.044	93.9	233.649	119.5	10.71	16226. 96.0
TOTAL	500.04	100.0	2418.524	100.0	1941.746	100.0	195.540	100.0	8.09	16897. 100.0

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1990 MISSION MODEL DEMAND AND FLEET STATISTICS

12/17/74 13,16,55

1990 ANNUAL TRAFFIC STATISTICS

SERVICE CLASS	PASSENGERS (MILL)	SEATS (MILL)	TRIPS (MILL)	RPM (BIL)	SEAT-MILES (BILL)	TRIP-MILES (BILL)	PAX / TRIP	SEAT/ TRIP	R-BAR SEATS (STATUTE	R-BAR TRIPS MILES)	LOAD FACTOR	MIN. TRIPS (MILL)
1	112,618	214,510	36,138	20,768	39,559	0.250	83.1	158.2	184.	157,	52.50	1,594
2	3,535	5,894	3,439	0.310	0.517	0.031	10.2	16.9	88.	89,	59.98	0,344
TOTAL												
2	116,152	220,404	39,577	21,079	40,076	0.281	75.1	142.8	182.	145,	52.60	1,938

1990

MAXIMUM PROFIT FLEET CHARACTERISTICS SUMMARY

ID	TRIPS (MIL)	TRIP-MILES (MILL)	REVENUE HOURS	BLOCK SPEED (MPH)	NO.OF UNITS	UTILIZATION (HRS/AC/YR)	FUEL MIL-TONS	REVENUE PAX-MILES	SEAT-MILES (BILL)	LOAD FACTOR	AVE RANGE	PRODUCTIVITY RPM/AC MIL
3212	0.345	30.6	109618.9	279.3	55.	1985.	0.128	0,310	0,919	0,338	88.	5.62
4212	0.150	12.2	45568.2	267.5	23.	1974.	0.060	0,221	0,488	0,453	80.	9.56
5212	0.086	7.0	26312.3	265.1	13.	1959.	0.039	0,153	0,349	0,438	81.	11.38
6212	0.031	2.6	9805.2	266.2	5.	1997.	0.016	0,078	0,157	0,500	84.	15.95
9016	2.147	406.9	1291472.0	315.1	521.	2479.	4.004	20,317	40,691	0,499	190.	39.00
TOTAL	2,758	459.3	1482776.0	309.8	618.	2401.	4.246	21,079	42,603	0,495	181.	34.13

SUMMARY REPORT BASED ON MAXIMUM PROFIT

CANDIDATE TRANSPORT	TRANSPORT UNITS	FLEET PCNT	FLEET \$MIL, PCNT	PRICE	ANNUAL REVENUE \$MIL, PCNT	ANNUAL PROFIT \$MIL, PCNT	RETURN ON INVEST	PASSENGER-MILES MIL, PCNT	PASSENGERS THNTD, PCNT	RANGE BAR
3212	55.22	8.9	130,987	4.3	53,063	2.2	-26,938	-9.8	-20,57	310., 1.5
4212	23.08	3.7	62,928	2.1	39,845	1.6	-5,582	-2.0	-8,87	221., 1.0
5212	13.43	2.2	41,331	1.3	27,364	1.1	-2,298	-0.8	-5,56	153., 0.7
6212	4.91	0.8	17,599	0.6	13,724	0.6	0,624	0.2	3,54	78., 0.4
9016	521.00	84.4	2813,400	91.8	2283,858	94.5	310,041	112.4	11,02	20317., 96.4
TOTAL	617.65	100.0	3066,244	100.0	2417,854	100.0	275,846	100.0	9,00	21079., 100.0

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B-7 REGIONAL AIRPORT SURVEY

The Reuben H. Donnelly Corporation provides Official Airlines Guide (OAG) data on airline scheduled service. Table B-17 show a portion of data sheets generated by a machine processing and sorting routine applied to an August 1973 OAG data tape. The sheets included are sample sheets of a total survey of world airlines and airports. Only those sheets are shown which include regional carriers contained in the initial network used in the parametric and conceptual aircraft analysis. These airlines are identified as:

- XK - Air California
- AL - Allegheny Airlines
- FL - Frontier Airlines
- RW - Hughes Air West
- NC - North Central Airlines
- OZ - Ozark Airlines
- PS - Pacific Southwest Airlines
- PI - Piedmont Aviation
- SO - Southern Airways
- TT - Texas International Airlines

Table B-18 contains the regional airline airports for which detailed statistical data were available for the year 1972. These data were from Federal Aviation Administration (FAA) sources.

Table B-19 presents data on runway lengths of length corrected for altitude and hot days. The correction is based on a simple FAA correction method which accounts for degradation in field length performance by an

average commercial jet aircraft. The correction accounts for altitude above sea level and for the highest temperature above 59°F expected to occur with a prediction reliability of 85 percent.

Runway Length Correction

The corrected runway lengths were computed by dividing the actual length by the product of the elevation correction factor, gradient correction factor, and temperature correction factor.

a. Elevation Correction Factor

$$F_e = (0.07 \times E + 1)$$

Where E = Airport elevation in thousands of feet

b. Temperature Correction Factor

$$F_t = 0.005 [T - (59 - 3.566E)] + 1$$

Where T = Normal maximum temperature in degrees Fahrenheit

c. Gradient Correction Factor

$$F_g = (0.1 \times G + 1)$$

Where G = % Effective Gradient

$$\text{Corrected Runway Length} = \frac{\text{Runway Length}}{F_e \times F_t \times F_g}$$

TABLE B-17

AIRLINES SERVING THE WORLD'S AIRPORTS
LISTED ALPHABETICALLY BY AIRLINE NAME
OAG AUGUST 1973

PAGE 8

28	1Y	AIR CALEDONIE			
	13	LDH	LDHND	NEW CALEDONIA	
29	XK	AIR CALIFORNIA-INTRA-STATE			
	1	OAK	OAKLAND	CALIF., USA	
	3	PSP	PALM SPRINGS	CALIF., USA	
	5	SAN	SAN DIEGO	CALIF., USA	
	7	SJC	SAN JOSE	CALIF., USA	
	2	ONT	ONTARIO	CALIF., USA	
	4	SME	SACRAMENTO	CALIF., USA	
	6	SFO	SAN FRANCISCO	CALIF., USA	
	8	SNA	SANTA ANA	CALIF., USA	
30	HC	AIR CAMBODGE			
	1	BKK	BANGKOK	THAILAND	
	3	HKG	HONG KONG	BR. CROWN COLONY	
	5	WDT	ODDOR MEANCHHEY	KHMER REP.	
	7	PNH	PHNOM PENH	KHMER REPUBLIC	
	9	SIN	SINGAPORE	SINGAPORE	
	2	NAJ	BATTAMBANG	KHMER REP.	
	4	WBF	KOMPONG SOM	KHMER REP.	
	6	PAI	PAILIN	KHMER REP.	
	8	SGN	SAIGON	S. VIETNAM	
31	AC	AIR CANADA			
	1	ANU	ANTIGUA	WEST INDIES	
	3	BDA	BERMUDA	ATLANTIC OCEAN	
	5	BRU	BRUSSELS	BELGIUM	
	7	ORD	CHICAGO	ILL-ORHARE ARPT, USA	
	9	CPH	COPENHAGEN	DENMARK	
	11	YEG	EDMONTON	ALTA-INT APT, CANADA	
	13	YFC	FREDERICTON	N.B.	
	15	YQX	GANDER	N.F.D., CANADA	
	17	YHZ	HALIFAX	NOVA SCOTIA	
	19	LHR	LONDON	ENGLAND-HEATHROW ARPT	
	21	LAX	LOS ANGELES	CALIF., USA	
	23	YQM	MONCTON	N.B.	
	25	YUL	MONTREAL	QUE., CANADA	
	27	NAS	NASSAU	BAHAMAS	
	29	YYB	NORTH BAY	ONT.	
	31	ORY	PARIS	FRANCE-ORLY ARPT	
	33	PRG	PRAGUE	CZECHOSLOVAKIA	
	35	YDR	REGINA	SASK.	
	37	YSS	SANTO JORDI	N.B.	
	39	YAP	SAULT STE MARIE	ONT.	
	41	SHW	SHANNON	IRELAND	
	43	YJT	STEPHENSVILLE	N.F.D.	
	45	YQY	SYDNEY	N.S.	
	47	YQT	THUNDER BAY	ONT.	
	49	YYZ	TORONTO	ONT., CANADA	
	51	YVR	VANCOUVER	B.C., CANADA	
	53	VIE	VIENNA	AUSTRIA	
	55	YWG	WINNIPEG	MAN., CANADA	
	57	ZRH	ZURICH	SWITZERLAND	
	2	BGI	BARBADOS	WEST INDIES	
	4	BOS	BOSTON	MASS., USA	
	6	YYC	CALGARY	ALTA., CANADA	
	8	CLE	CLEVELAND	OHIO, USA	
	10	YXR	EARLTON	ONT.	
	12	FRA	FRANKFURT	GERMANY	
	14	FFO	FREEPORT	BAHAMAS	
	16	PIK	GLASGOW	SCOT-PRESTWICK ARPT.	
	18	KIN	KINGSTON	JAMAICA	
	20	YXU	LONDON	ONT.	
	22	MIA	MIAMI	FLA., USA	
	24	MBJ	MONTIGO BAY	JAMAICA	
	26	SVN	MOSCOW	USSR-SHEKHEMETYEVO ARPT	
	28	JFK	NEW YORK	NY-KENNEDY INT ARPT, USA	
	30	YOW	OTTAWA	ONTARIO, CANADA	
	32	POS	PORT OF SPAIN	TRINIDAD	
	34	YQB	QUEBEC	QUE.	
	36	YUY	ROBYN - NORANDA	QUE.	
	38	YXE	SASKATOON	SASK.	
	40	YZV	SEVEN ISLANDS	QUE.	
	42	YYI	ST. JOHN'S	N.F.D.	
	44	YSO	SODORBY	ONT.	
	46	TPA	TAMPA	FLA., USA	
	48	YIS	TIMMINS	ONT.	
	50	YVD	VAL D'OR	QUE.	
	52	YYJ	VICTORIA	B.C.	
	54	YQG	WINDSOR	ONT., CANADA	
	56	YQT	YARMOUTH	N.S.	
32	CF	AIR CENTRE			
	1	CFE	CLERMONT-FERRAND	FRANCE	
	2	LPY	LE PUY	FRANCE	

AIRLINES SERVING THE WORLD'S AIRPORTS
LISTED ALPHABETICALLY BY AIRLINE NAME
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85 NH ALL NIPPON

21 OIT OITA, JAPAN

23 OKA OKINAWA, RYUKYU IS., JAPAN

25 OSA OSAKA, JAPAN

27 OTS SAPPORO, JAPAN-CHITOSE ARPT.

29 TAK TAKAMATSU, JAPAN

31 TTJ TOTTORI, JAPAN

33 UBE UBE, JAPAN

35 YGJ YONAGO, JAPAN

22 OKJ OKAYAMA, JAPAN

24 OMJ OMIYA, JAPAN

26 OIM OSHIMA IS., JAPAN

28 SDJ SENDAI, JAPAN

30 HND TOKYO, JAPAN-HANEDA AIRPORT

32 TOY TOYAMA, JAPAN

34 GAJ YAMAGATA, HONSHU, JAPAN

86 AL ALLEGHENY AIRLINES

1 LAK AKRON/CANTON, OHIO, USA

3 ABE ALLENTOWN, PA., USA

5 ATY ATLANTIC CITY, N.J., USA

7 BGM BINGHAMTON, N.Y., USA

9 BOS BOSTON, MASS., USA

11 BDR BRIDGEPORT, CONN., USA

13 BTY BURLINGTON, VT., USA

15 CRW CHARLESTON, W. VA., USA

17 ORD CHICAGO, ILL-OHARE ARPT, USA

19 CRB CLARKSBURG, W. VA., USA

21 CMH COLUMBUS, OHIO, USA

23 DAY DAYTON, OHIO, USA

25 DUJ DU BOIS, PA., USA

27 ELM ELMIRA, N.Y., USA

29 EVV EVANSVILLE, IND., USA

31 GFL GLENS FALLS, N.Y., USA

33 HGR HAGERSTOWN, MD., USA

35 BDL HARTFORD, CONN., USA

37 HTS HUNTINGTON, W. VA., USA

39 ISP ISLIP, N.Y., USA

41 JHW JAMESTOWN, N.Y., USA

43 EEW KEENE, N.H., USA

45 LNS LANCASTER, PA., USA

47 LIA LIMA, OHIO, USA

49 MFD MANSFIELD, OHIO, USA

51 MEM MEMPHIS, TENN., USA

53 YUL MONTREAL, QUE., CANADA

55 MIE MONTE, IND., USA

57 HVN NEW HAVEN, CONN., USA

59 JFK NEW YORK, NY-KENNEDY INT ARPT, USA

61 EWR NEW YORK, NY-NEWARK ARPT, USA

63 ORF NORFOLK, VA., USA

65 PKB PARKERSBURG, W. VA., USA

67 PNE PHILADELPHIA, PA-NE ARPT, USA

69 PIT PITTSBURGH, PA., USA

71 PVD PROVIDENCE, R.I., USA

73 ROC ROCHESTER, N.Y., USA

75 SBY SALISBURY, MD., USA

2 ALB ALBANY, N.Y., USA

4 AOU ALTOONA, PA., USA

6 BAL BALTIMORE, MD., USA

8 BMB BLOOMINGTON, IND., USA

10 BFD BRADFORD, PA., USA

12 BUF BUFFALO, N.Y., USA

14 RND LAPEL, N.J., USA

16 MDW CHICAGO, ILL-MIDWAY ARPT, USA

18 CVG CINCINNATI, OHIO, USA

20 CLE CLEVELAND, OHIO, USA

22 DAN DANVILLE, ILL., USA

24 DTW DETROIT, MICH-METROPOLITAN APT, USA

26 EKW ELKINS, W. VA., USA

28 ERI ERIE, PA., USA

30 FKL FRANKLIN, PA., USA

32 GRH GRAND RAPIDS, MICH., USA

34 MDT HARRISBURG, PA-INTERNATIONAL ARPT.

36 HZL HAZLETON, PA., USA

38 IND INDIANAPOLIS, IND., USA

40 ITH ITHACA, N.Y., USA

42 JST JOHNSTOWN, PA., USA

44 LAF LAFAYETTE, IND., USA

46 LEX LEXINGTON, KY., USA

48 SDF LOUISVILLE, KY., USA

50 MSS MASSENA, N.Y., USA

52 MSP MINNEAPOLIS-ST PAUL, MINN, USA

54 MGH MORRISTOWN, N. VA., USA

56 BNA NASHVILLE, TENN., USA

58 GON NEW LONDON, CONN., USA

60 LGA NEW YORK, NY-LA GUARDIA ARPT, USA

62 PHF NEWPORT NEWS, VA., USA

64 OGS OGDENSBURG, N.Y., USA

66 PHL PHILADELPHIA, PA., USA

68 PSB PHILIPSBURG, PA., USA

70 PLB PLATTSBURGH, N.Y., USA

72 HNH HEADING, PA., USA

74 ROT ROTLAND, VT., USA

76 SLK SARANAC LAKE, N.Y., USA

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AIRLINES SERVING THE WORLD'S AIRPORTS
LISTED ALPHABETICALLY BY AIRLINE NAME
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86	AL	ALLEGHENY AIRLINES	78	STL	ST. LOUIS, MO., USA
77	SNB	SOUTH BEND, IND., USA	80	HOF	TERRE HAUTE, IND., USA
79	SYR	SYRACUSE, N.Y., USA	82	YYZ	TORONTO, ONT., CANADA
81	TOL	TOLEDO, OHIO, USA	84	UCA	UTICA, N.Y., USA
83	TTN	TRENTON, N.J., USA	86	ART	WATERLOO, N.Y., USA
85	DCA	WASHINGTON, DC-NATIONAL ARPT., USA	88	AVP	WILKES-BARRE/SCRANTON, PA., USA
87	HPN	WHITE PLAINS, N.Y., USA	90	ILG	WILMINGTON, DEL., USA
89	JPT	WILLIAMSPORT, PA., USA	92	YNG	YOUNGSTOWN, OHIO, USA
91	ORH	NORCESTER, MASS., USA			
87	VJ	ALLEN AVIATION, INC.			
1	MDI	KANSAS CITY, MO., USA	2	LNC	LAWRENCE, KAN., USA
3	MHK	MANHATTAN, KAN., USA	4	TOP	TOPEKA, KAN., USA
88	IS	ALPHA AIRLINES			
1	ITO	HILU, HAWAII; HAWAII, USA	2	HNL	HONOLULU, OAHU; HAWAII, USA
3	OGG	KAHULUI, MAUI; HAWAII, USA	4	PRK	KAHANAKAKAI, MAUI; HAWAII, USA
5	KOA	KONA, HAWAII; HAWAII, USA	6	LTH	LIHUE, KAUAI; HAWAII, USA
89	AK	ALTAIR AIRLINES INC-AIR-TAXI			
1	ALB	ALBANY, N.Y., USA	2	ABE	ABINGTON, PA., USA
3	BAL	BALTIMORE, MD., USA	4	BDR	BRIDGEPORT, CONN., USA
5	MDT	HARRISBURG, PA-INTERNATIONAL ARPT.	6	BDF	HARTFORD, CONN., USA
7	ISP	ISLIP, N.Y., USA	8	PBL	PHILADELPHIA, PA., USA
9	RIC	RICHMOND, VA., USA	10	DCA	WASHINGTON, DC-NATIONAL ARPT., USA
11	HPN	WHITE PLAINS, N.Y., USA	12	AVP	WILKES-BARRE/SCRANTON, PA., USA
13	JPT	WILLIAMSPORT, PA., USA	14	ILG	WILMINGTON, DEL., USA
90	DY	ALYEMDA, DEMOCRATIC YEMEN AIRLINES			
1	ADN	ADEN, DEM. REP. OF YEMEN	2	RAY	AL GHAYDAH, DEM. REP. OF YEMEN
3	AKK	ATAQ, DEM. REP. OF YEMEN	4	BHN	BEIHAN, DEM. REP. OF YEMEN
5	BEY	BEIRUT, LEBANON	6	BUD	BURAO, SOMALI REP.
7	CAI	CAIRO, ARAB REP. OF EGYPT	8	JTB	DJIBOUTI, FR TER ARRS & ISSAS
9	GXF	GHURAF, DEM. REP. OF YEMEN	10	HGA	HARGEISA, SOMALI REP.
11	KMI	KUMAIT	12	MFK	MAIFAA, DEM. REP. OF YEMEN
13	MGO	MOGADISHU, SOMALI REP.	14	USD	USDAH, S. ARABIA
15	RIY	RIYAN, DEM. REP. OF YEMEN	16	TAI	TAIZ, YEMEN ARAB REPUBLIC
91	AA	AMERICAN AIRLINES			
1	ACA	ACAPULCO, MEXICO	2	ALB	ALBANY, N.Y., USA
3	AUA	ARUBA, NETH. ANTILLES	4	AKL	AUCKLAND, NEW ZEALAND
5	BAL	BALTIMORE, MD., USA	6	BOS	BOSTON, MASS., USA
7	BUF	BUFFALO, N.Y., USA	8	CRW	CHARLESTON, W. VA., USA
9	MUN	CHICAGO, ILL-MIDWAY ARPT, USA.	10	ORD	CHICAGO, ILL-O'HARE ARPT. USA.
11	CVB	CINCINNATI, OHIO, USA	12	CLE	CLEVELAND, OHIO, USA
13	CMH	COLUMBUS, OHIO, USA	14	CUR	CURACAO, NETH. ANTILLES
15	DAL	DALLAS/FT. WORTH, TEXAS, USA	16	DAY	DAYTON, OHIO, USA
17	DTW	DETROIT, MIC-METROPOLITAN API, USA	18	ELF	EL PASO, TEXAS, USA
19	BUL	HARTFORD, CONN., USA	20	HNL	HONOLULU, OAHU; HAWAII, USA

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LISTED ALPHABETICALLY BY AIRLINE NAME
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193	FI	FLUGFELAG-ICELANDAIR	10	IFJ	ISAFJORDUR, ICELAND
9	H/K	HUSAVIK, ICELAND	12	UAK	NARSARSSUAQ, GREENLAND
11	LHR	LONDON, ENGLAND-HEATHROW APPI	14	USL	OSLO, NORWAY
13	NOR	NORDFJORDUR, ICELAND	16	REN	RAUFARHOEN, ICELAND
15	PEJ	PATERKSEFJORDUR, ICELAND	18	REK	REYKJAVIK, ICELAND
17	KEF	REYKJAVIK, ICE. KEFLAVIK APPI.	20	THO	THORSHOFN, ICELAND
19	SAK	SAUDARKHOKUR, ICELAND	22	VEY	VESTMANNAREYJAR, ICELAND
21	VAG	VAGAR IS, FAEROE IS, DENMARK			

194	FL	FRONTIER AIRLINES	2	ALS	ALAMOSA, COLO., USA
1	ALM	ALAMOGORDO, N.M., USA	4	ATA	ALLIANCE, NEBR., USA
3	ABQ	ALBUQUERQUE, N.M., USA	6	BVO	BARTLESVILLE, OKLA., USA
5	AMA	AMARILLO, TEXAS, USA	8	BIS	BISMARCK, N.D., USA
7	BIL	BILLINGS, MONT., USA	10	LPR	CASPER, WYO., USA
9	BZN	BOZEMAN, MONT., USA	12	CYS	CHEYENNE, WYO., USA
11	CDR	CHADRON, NEBR., USA	14	COS	COLORADO SPRINGS, COLO., USA
13	COD	CODY, WYO., USA	16	CEZ	CORTEZ, COLO., USA
15	OLU	COLUMBUS, NEBR., USA	18	DEN	DENVER, COLO., USA
17	DAL	DALLAS/FT. WORTH, TEXAS, USA	20	ELP	EL PASO, TEXAS, USA
19	DRO	DURANGO, COLO., USA	22	FMN	FARMINGTON, N.M., USA
21	DDG	ENID, OKLA., USA	24	FLG	FLAGSTAFF, ARIZ., USA
23	FYV	FAYETTEVILLE, ARK., USA	26	FSM	FT. SMITH, ARK., USA
25	TBN	FT. LEONARD WOOD, MO., USA	28	GCR	GARDEN CITY, KAN., USA
27	GUP	GALLUP, N.M., USA	30	GDV	GLENDIVE, MONT., USA
29	GGW	GLASGOW, MONT., USA	32	GBI	GRAND ISLAND, NEBR., USA
31	GID	GODDARD, KAN., USA	34	GTF	GREAT FALLS, MONT., USA
33	GJT	GRAND JUNCTION, COLO., USA	36	HHD	HARRISON, ARK., USA
35	GUC	GUNNISON, COLO., USA	38	HVH	HAVRE, MONT., USA
37	HSI	HASTINGS, NEBR., USA	40	HOT	HOT SPRINGS, ARK., USA
39	HYS	HAYS, KAN., USA	42	JLN	JOPLIN, MO., USA
41	JAC	JACKSON, WYO., USA	44	EAR	KEARNEY, NEBR., USA
43	KCI	KANSAS CITY, MO., USA	46	LAR	LARAMIE, WYO., USA
45	LAA	LARAR, COLO., USA	48	LAW	LAWTON, OKLA., USA
47	LAS	LAS VEGAS, NEV., USA	50	LBL	LIGERAL, KAN., USA
49	LWT	LEWISTOWN, MONT., USA	52	LIT	LITTLE ROCK, ARK., USA
51	LNR	LINCOLN, NEBR., USA	54	MCK	MC COOK, NEBR., USA
53	MHK	MANHATTAN, KAN., USA	56	MCS	MILES CITY, MONT., USA
55	MEM	MEMPHIS, TENN., USA	58	MSO	MISSOULA, MONT., USA
57	MOT	MINTO, N.D., USA	60	MKG	MUSKOGEE, OKLA., USA
59	MTJ	MONTRUSE, COLO., USA	62	OKC	OKLAHOMA CITY, OKLA., USA
61	LBF	NORTH PLATTE, NEBR., USA	64	PAX	PARTS, TEXAS, USA
63	OMA	OMAHA, NEBR., USA	66	PHX	PHOENIX, ARIZ., USA
65	PPF	PARSONS, KAN., USA	68	PUB	PUEBLO, COLO., USA
67	PNC	PONCA CITY, OKLA., USA	70	RIV	RIVERTON, WYO., USA
69	RAP	RAPID CITY, S.D., USA	72	SLN	SALINA, KAN., USA
71	HKS	ROCK SPRINGS, WYO., USA	74	BEF	SCOTTSBLUFF, NEBR., USA
73	SLC	SALT LAKE CITY, UTAH, USA	76	SNY	STONEY, NEBR., USA
75	SDY	STONEY, MONT., USA	78	SIL	ST. LOUIS, MO., USA
77	SVC	SILVER CITY, N.M., USA			

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194 FL FRONTIER AIRLINES

79 HON STEAMBOAT SPRINGS, COLO., USA
81 TOP TOPEKA, KAN., USA
83 TUL TULSA, OKLA., USA
85 MYS WEST YELLOWSTONE, MONT., USA
87 ISN WILLISTON, N.D., USA
89 OLF WOLF POINT, MONT., USA

80 SMO STILLWATER, OKLA., USA
82 TOS TUCSON, ARIZ., USA
84 VEL VERNAL, UTAH, USA
86 ICT WICHITA, KAN., USA
88 INW WINSTON, ARIZ., USA
90 WRL WURLAND, WYO., USA

195 GA GARUDA INDONESIA AIRWAYS

1 AMU AMBON, MOLUCCA IS., INDONESIA
3 AMS AMSTERDAM, NETHERLANDS
5 BPN BALIKPAPAN, BORNEO, INDONESIA
7 BKK BANGKOK, THAILAND
9 BKS BENGKULU, SUMATRA, INDONESIA
11 BOM BOMBAY, INDIA
13 OPS OENPASAR, BALI, INDONESIA
15 HKG HONG KONG, BR. CROWN COLONY
17 UJB JABOT, INDONESIA
19 KHI KARACHI, PAKISTAN
21 KUL KUALA LUMPUR, MALAYSIA
23 MES MEDAN, SUMATRA, INDONESIA
25 PDG PADANG, SUMATRA, INDONESIA
27 PLN PALEMBANG, SUMATRA, INDONESIA
29 LBB PARIS, FRANCE-LE ROUREL ARPT
31 FCO ROME, ITALY-LEONARDO DA VINCI ARPT
33 SIN SINGAPORE, SINGAPORE
35 SYD SYDNEY, NSW AUSTRALIA
37 TNJ TANJUNG PINANG, BINTAN, INDO.
39 UPG UJUNG PANDANG, CELEBES, INDO.

2 AMI AMPENAN, LOMBOK IS., INDONESIA
4 ATH ATHENS, GREECE
6 BTJ BANDAR AJEN, SUMATRA, INDO.
8 BJJ BANJARNASIN, BORNEO, INDO.
10 BJK BIAK, N. IRAN, INDONESIA
12 CMB COLUMBO, REP. OF SRI LANKA
14 FRA FRANKFURT, GERMANY
16 JKT JAKARTA, JAVA, INDONESIA
18 JGG JOGJAKARTA, JAVA, INDONESIA
20 KDI KENDARI, CELEBES, INDONESIA
22 KOE KUPANG, TIMOR, INDONESIA
24 MOC MENADO, INDONESIA
26 PKU PAKANBARU, SUMATRA, INDONESIA
28 PRK PANGKAL PINANG, INDONESIA
30 PWA PONTIANAK, BORNEO, INDONESIA
32 SRG SEMARANG, JAVA, INDONESIA
34 SUB SURABAYA, JAVA, INDONESIA
36 TJU TANJUNG APARAN, INDONESIA
38 TKG TELUKBETUNG, SUMATRA, INDO.

196 GO GCS AIRLINES

1 CLE CLEVELAND, OHIO, USA
3 MFD MANFIELO, OHIO, USA

2 GQQ GALLON, OHIO, USA

197 YY GENERAL AIR

1 BRE BREMEN, GERMANY
3 FRA FRANKFURT, GERMANY
5 HGL HELGOLAND, GERMANY
7 KSF KASSEL, GERMANY
9 MUC MUNICH, GERMANY
11 AGE WASSERBODDE, GERMANY

2 CGN COLOGNE, GERMANY
4 HAM HAMBURG, GERMANY
6 NVQ JUIST, GERMANY
8 LBC LUBECK, GERMANY
10 WTD NORDERNEY, GERMANY
12 BMT WESTERLAND, GERMANY

198 GD GEYSERLAND AIRWAYS LTD.

1 AKL AUCKLAND, NEW ZEALAND
3 KAO KAIRORU, NEW ZEALAND
5 PTA PIATAMATA, NEW ZEALAND

2 GIS GISBORNE, NEW ZEALAND
4 KNR KANERU, NEW ZEALAND
6 ROT ROTORUA, NEW ZEALAND

199 GH GHANA AIRWAYS

1 ABJ ABIDJAN, IVORY COAST

2 ACC ACCRA, GHANA

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214 HY HOUSTON METRO AIRLINES

1 BPT BEAUMONT/PT. ARTHUR, TEX., USA
3 GLS GALVESTON, TEXAS, USA
5 LJA LAKE JACKSON, TEXAS, USA

2 CLC CLEAR LAKE CITY, TEXAS, USA
4 JAH HOUSTON, TEXAS, USA
6 VCT VICTORIA, TEXAS, USA

215 XE HUBB AIRLINES-AIR-TAXI

1 BTL BATTLE CREEK, MICH., USA
3 ORD CHICAGO, ILL-O'HARE ARPT, USA
5 DTW DETROIT, MICH-METROPOLITAN APT, USA

2 CGX CHICAGO, ILL-MEIGS FIELD, USA
4 DET DETROIT, MICH-CITY ARPT, USA
6 FWA FT. WAYNE, IND., USA

216 HW HUGHES AIRWEST

1 APV APPLE VALLEY, CALIF., USA
3 BFL BAKERSFIELD, CALIF., USA
5 BOI BOISE, IDAHO, USA

7 YVC CALGARY, ALTA., CANADA
9 CIO CHICO, CALIF., USA
11 IPL EL CENTRO, CALIF., USA

13 EUG EUGENE, ORE., USA
15 FAT FRESNO, CALIF., USA
17 STF GREAT FALLS, MONT., USA

19 HON HONOLULU, HAWAII, USA
21 IYK INYOKERN, CALIF., USA
23 KGM KINGMAN, ARIZ., USA

25 LAP LA PAZ, MEXICO
27 TVL LAKE TAHOE, CALIF., USA
29 LWS LEWISTON, IDAHO, USA

31 MZT MAZATLAN, MEXICO
33 MRY MONTEREY, CALIF., USA
35 OAK OAKLAND, CALIF., USA

37 ONT ONTARIO, CALIF., USA
39 PGA PAGE, ARIZ., USA
41 PMD PALMDALE, CALIF., USA

43 PRD PASO ROBLES, CALIF., USA
45 PIA POCAHELLO, IDAHO, USA
47 PVR PUERTO VALLARTA, MEXICO

49 RDD REDDING, CALIF., USA
51 RNO RENO, NEV., USA
53 SLC SALT LAKE CITY, UTAH, USA

55 SFO SAN FRANCISCO, CALIF., USA
57 SNA SANTA ANA, CALIF., USA
59 SMX SANTA MARIA, CALIF., USA

61 SEA SEATTLE, WASH., USA
63 SCK STOCKTON, CALIF., USA
65 TWF TWIN FALLS, IDAHO, USA

67 EAT EMMETT, WASH., USA
69 YUM YUMA, ARIZ., USA

2 AST ASTORIA, ORE., USA

4 BLH BLYTHE, CALIF., USA

6 BUR BURBANK, CALIF., USA

8 CDC CEDAR CITY, UTAH, USA

10 CEC CRESCENT CITY, CALIF., USA

12 EPH EPHRATA, WASH., USA

14 ACV EDENHURST, CALIF., USA

16 GCN GRAND CANYON, ARIZ., USA

18 GDL GUADALAJARA, MEXICO

20 IDA IDAHO FALLS, IDAHO, USA

22 FCA KALISPELL, MONT., USA

24 LMT KLAMATH FALLS, ORE., USA

26 LHO LAKE HAVASU CITY, ARIZ., USA

28 LAS LAS VEGAS, NEV., USA

30 LAX LOS ANGELES, CALIF., USA

32 MFR MEDFORD, ORE., USA

34 OTH NORTH BEND, ORE., USA

36 OLR OLYMPIA, WASH., USA

38 OXA OXNARD, CALIF., USA

40 PSP PALM SPRINGS, CALIF., USA

42 PSC PASCO, WASH., USA

44 PNX PHOENIX, ARIZ., USA

46 PDX PORTLAND, ORE., USA

48 PDM PULLMAN, WASH., USA

50 RDM REDMOND, ORE., USA

52 SMC SACRAMENTO, CALIF., USA

54 SAN SAN DIEGO, CALIF., USA

56 SJC SAN JOSE, CALIF., USA

58 SBA SANTA BARBARA, CALIF., USA

60 STS SANTA ROSA, CALIF., USA

62 GEG SPokane, WASH., USA

64 TUS TUCSON, ARIZ., USA

66 ALN WALLA WALLA, WASH., USA

68 YRM YAKIMA, WASH., USA

217 IB IBERIA

1 ALC ALICANTE, SPAIN

2 LEI ALMERIA, SPAIN

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286 NP NOR-CAL AVIATION, INC.
5 SMC SACRAMENTO, CALIF., USA

287 NK NORCANAIR

1 YVC LAC LA RONGE, SASK.
3 YDR REGINA, SASK.
5 YSF STONEY RAPIDS, SASK.
7 ZWL MOLLASTON LAKE, SASK

2 YPA PRINCE ALBERT, SASK.
4 YXE SASKATOON, SASK.
6 YBE URANIUM CITY, SASK.

288 ND NORDAIR

1 YMT CHIBOUGAMAU, QUEBEC
3 YKU FORT GEORGE, QUEBEC
5 YVP FT. CHINO, QUE.
7 YHX HALL BEACH, N.W.T.
9 WWS LA GRANDE, QUEBEC, CANADA
11 YUL MONTREAL, QUE., CANADA
13 PIT PITTSBURGH, PA., USA
15 YVO VAL D'OR, QUE.

2 YGY DECEPTION BAY, QUE.
4 YFB FROBISHER BAY, N.W.T.
6 YGW GREAT WHALE, QUE.
8 YHM HAMILTON, ONT.
10 YMQ MONTAGNI, QUEBEC, CANADA
12 YOW OTTAWA, ONTARIO, CANADA
14 YRR RESOLUTE BAY, N.W.T.
16 YQG WINDSOR, ONT., CANADA

289 NR NORONTAIR

1 YXR EARLTON, ONT.
3 YSB SUDBURY, ONT.

2 YAM SAULT STE MARIE, ONT.
4 YTS TIMMINS, ONT.

290 JV NORTH CAY AIRWAYS

1 BQN AGUADILLA, P.R.
3 MAZ MAYAGUEZ, PUERTO RICO
5 SIG SAN JUAN, P.R.-ISLA GRANDE ARPT
7 SIX ST. CROIX, VIRGIN IS.
9 VQS VIEQUES, PUERTO RICO

2 CPX COLEBRA, PUERTO RICO
4 PSE PONCE, PUERTO RICO
6 SJO SAN JUAN, PUERTO RICO
8 STT ST. THOMAS, VIRGIN IS.

291 NC NORTH CENTRAL AIRLINES

1 ABR ABERDEEN, S.D., USA
3 JVL BELOIT/JAMESVILLE, WIS., USA
5 BEH BENION HARBOR, MICH., USA
7 BRD BRAINERD, MINN., USA
9 MDW CHICAGO, ILL-MIDWAY ARPT, USA
11 CVG CINCINNATI, OHIO, USA
13 CMH COLUMBUS, OHIO, USA
15 DEN DENVER, COLO., USA
17 DVL DEVILS LAKE, N.D., USA
19 EAU EAU CLAIRE, WIS., USA
21 FRI FARGO, N.D., USA
23 FNT FLINT, MICH., USA
25 GRR GRAND RAPIDS, MICH., USA
27 HAN HANCOCK, MICH., USA
29 HUN HURON, S.D., USA
31 INT IRON MOUNTAIN, MICH., USA
33 JAN JACKSON, MICH., USA
35 MCI KANSAS CITY, MO., USA

2 APN ALPINA, MICH., USA
4 BJT BENNETT, MINN., USA
6 BIS BISMARCK, N.D., USA
8 BKX BROOKINGS, S.D., USA
10 ORD CHICAGO, ILL-MIDWAY ARPT, USA
12 CLE CLEVELAND, OHIO, USA
14 DAY DAYTON, OHIO, USA
16 DTW DETROIT, MICH-METROPOLITAN APT, USA
18 DLH DULUTH, MINN., USA
20 ESC ESCANABA, MICH., USA
22 FRR FARGO, N.D., USA
24 GFK GRAND FORKS, N.D., USA
26 GRR GREEN BAY, WIS., USA
28 HIB HIBBING, MINN., USA
30 INL INT'L FALLS, MINN., USA
32 IMD IRONWOOD, MICH., USA
34 KAO KALAMAZOO, MICH., USA
36 LSE LA CROSSE, WIS., USA

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291 NC NORTH CENTRAL AIRLINES

37 LAN LANSING, MICH., USA
39 MBL MANISTEE, MICH., USA
41 MKT MANKATO, MINN., USA
43 MNM MENOMINEE, MICH., USA
45 MSP MINNEAPOLIS/ST PAUL, MINN, USA
47 MHE MITCHELL, S.D., USA
49 TGA NEW YORK, NY-LA GUARDIA ARPT., USA
51 OMA OMAHA, NEBR., USA
53 PLN PELLSTON, MICH., USA
55 RAP RAPID CITY, S.D., USA
57 RST ROCHESTER, MINN., USA
59 SSM SAULT STE MARIE, MICH., USA
61 FSD SIOUX FALLS, S.D., USA
63 TVF THIEF RIVER FALLS, MINN., USA
65 YYZ TORONTO, ONT., CANADA
67 ATY WATERTOWN, S.D., USA
69 DTG WORTHINGTON, MINN., USA

39 MSW MADISON, WIS., USA
40 MTW MANITOWOC, WIS., USA
42 MQT MARQUETTE, MICH., USA
44 MKE MILWAUKEE, WIS., USA
46 MDT MINOT, N.D., USA
48 MKG MUSKEGON, MICH., USA
50 MFK MILWAUKEE, WIS., USA
52 USH USHAKUSH, WIS., USA
54 PIR PIERRE, S.D., USA
56 RHI RHINELANDER, WIS., USA
58 MBS SAGINAW, MICH., USA
60 SUX SIOUX CITY, IOWA, USA
62 SBN SOUTH BEND, IND., USA
64 YOT THUNDER BAY, ONT.
66 TVC TRAVERSE CITY, MICH., USA
68 CNA NAUSAU, WISC-CENTRAL WIS ARPT. USA
70 YKN YANKTON, S.D., USA

292 NS NORTHEAST AIRLINES LIMITED

1 AMS AMSTERDAM, NETHERLANDS
3 BIO BILBAO, SPAIN
5 DUB DUBLIN, IRELAND
7 JER JERSEY, CHANNEL IS., U.K.
9 LBA LEEDS/BRADFORD, ENGLAND
11 LUX LUXEMBOURG, LUXEMBOURG

2 BFS BELFAST, N. IRELAND
4 BOD BORDEAUX, FRANCE
6 GCI GUERNSEY, CHANNEL IS., U.K.
8 KLU KLAGENFURT, AUSTRIA
10 LHR LONDON, ENGLAND-HEATHROW ARPT
12 NCL NEWCASTLE, ENGLAND

293 WS NORTHERN WINGS LTD.

1 YBX BLANC SABLO, QUE.
3 YHR HARRINGTON HARBOUR, QUE.
5 ZKG KEGASKA, QUEBEC
7 YLP MINGAN, QUE.
9 ZFB OLD FORT BAY, QUEBEC
11 YZV SEVEN ISLANDS, QUE.
13 ZSP ST. PAUL, QUEBEC

2 ZGS GETHSEMANI, QUEBEC
4 YGV RAVHE ST. PIERRE, QUE.
6 ZLT LA TABATIERE, QUEBEC
8 YNA NATASHQUAN, QUE.
10 YTN RIVIERE AU TONNERRE, QUE.
12 YIF ST. AUGUSTIN, QUE.
14 YWH WHALEHEAD, QUEBEC

294 HA NORTHWARD AIRLINES LTD.

1 LAK AKLAVIK, N.W.T.
3 YDA DAWSON CITY, Y.T.
5 YGH FT. GOOD HOPE, N.W.T.
7 ZFN FT. NORMAN, N.W.T.
9 YNA MAYO, Y.T.
11 YUB TUKTOYAKTUK, N.W.T.

2 YJM ARCTIC RED RIVER, N.W.T.
4 YNJ FORT FRANKLIN, N.W.T.
6 ZFN FT. MCPHERSON, N.W.T.
8 YEV INUVIK, NWT
10 YVQ NORMAN WELLS, NWI
12 YXY WHITEHORSE, Y.T.

295 NW NORTHWEST ORIENT AIRLINES

1 ANC ANCHORAGE, ALASKA, USA
3 BIL BILLINGS, MONT., USA
5 BOS BOSTON, MASS., USA
7 BTM BUTTE, MONT., USA

2 ATL ATLANTA, GA., USA
4 BIS BISMARCK, N.D., USA
6 BZN BOZEMAN, MONT., USA
8 MDW CHICAGO, ILL-MIDWAY ARPT., USA

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296	OA	OLYMPIC AIRWAYS			
53	ZRH	ZURICH, SWITZERLAND			
297	DB	OPAL AIR SERVICES			
1	ADL	ADELAIDE, S. AUSTRALIA	2	ADD	ANDAMOOKA, S. AUST.
3	AYQ	AYERS HUCK, NT, AUSTRALIA	4	CPD	COOPER PEDY, S. AUSTRALIA
298	DL	OSTERREICHISCHE LUFTTRANSPORT GMBH			
1	WIK	WIK, GERMANY	2	DUJ	DUSSELDORF, GERMANY
3	WTX	EMDEN, GERMANY	4	WHB	HAGE, GERMANY
5	HAI	HANNOVER, GERMANY	6	HSL	HELGOLAND, GERMANY
7	WVQ	JUIST, GERMANY	8	WYP	LANGEN, GERMANY
9	WTU	NORDERNEY, GERMANY	10	AGE	WANGEROOG, GERMANY
299	OE	OUT ISLAND AIRWAYS			
1	ASD	ANDROS TOWN, BAHAMAS	2	UBL	CHUB CAY, BAHAMAS
3	CRI	CROOKED ISLAND, BAHAMAS	4	LGI	DEADMANS CAY, L.I. BAH
5	FFO	FREEPORT, BAHAMAS	6	GOT	GEORGE TOWN, BAHAMAS
7	GHB	GOVERNORS HARBOUR, BAH.	8	GHC	GREAT HARBOUR CAY, BAH.
9	IGA	INAGUA, BAHAMAS	10	MAY	MANGROVE CAY, BAHAMAS
11	MHH	MARSH HARBOUR, BAHAMAS	12	NYG	NAYAGUANA, BAHAMAS
13	MIA	MIAMI, FLA., USA	14	NAS	NASSAU, BAHAMAS
15	ELH	NORTH ELEUTHERA, BAHAMAS	16	SAD	SAN ANDROS, ANDROS IS. BAH.
17	ZSA	SAN SALVADOR, BAHAMAS	18	TZN	SOUTH ANDROS, BAHAMAS
19	SML	STELLA MARIS, LONG IS. BAH.	20	BIC	THE BIGHT, BAHAMAS
21	TCB	TREASURE CAY, BAHAMAS			
300	OZ	OZARK AIRLINES			
1	BMI	BLOOMINGTON, ILL., USA	2	BAL	BURLINGTON, IOWA, USA
3	CGI	CAPE GIRARDEAU, MO., USA	4	CTD	CEAR RAPIDS/ST. LOUIS CITY, IA., USA
5	CMZ	CHAMPAIGN, ILL., USA	6	MDW	CHICAGO, ILL-MIDWAY ARPT, USA.
7	ORD	CHICAGO, ILL-OHARE ARPT, USA.	8	CKV	CLARKSVILLE, TENN., USA
9	CLT	CLINTON, IOWA, USA	10	COB	COLUMBIA, MO., USA
11	DAL	DALLAS/FT. WORTH, TEXAS, USA	12	DEC	DECATUR, ILL., USA
13	DEN	DENVER, COLO., USA	14	DSM	DES MOINES, IOWA, USA
15	DBQ	DUBUQUE, IOWA, USA	16	FOD	FT. DODGE, IOWA, USA
17	TBN	FT. LEONARD WOOD, MO., USA	18	GBG	GALESBURG, ILL., USA
19	IND	INDIANAPOLIS, IND., USA	20	JLN	JOPLIN, MO., USA
21	MCI	KANSAS CITY, MO., USA	22	IRK	KIRKSVILLE, MO., USA
23	AIZ	LAKE OF THE OZARKS, MO., USA	24	SOF	LOUISVILLE, KY., USA
25	MSN	MADISON, WIS., USA	26	MMA	MARION, ILL., USA
27	PCN	MASON CITY, IOWA, USA	28	MTD	MATTOON, ILL., USA
29	MKE	MILWAUKEE, WIS., USA	30	MSP	MINNEAPOLIS/ST PAUL, MINN, USA
31	MLI	MOBILE, ILL., USA	32	MVN	MONTE VERNON, ILL., USA
33	BNA	NASHVILLE, TENN., USA	34	LGA	NEW YORK, NY-LA GUARDIA ARPT., USA
35	OMA	OMAHA, NEBR., USA	36	OTM	OTTUMWA, IOWA, USA
37	OMB	OWENSBORO, KY., USA	38	PAH	PAULICAH, KY., USA
39	PTA	PEORIA, ILL., USA	40	GIN	QUINCY, ILL., USA
41	RST	ROCHESTER, MINN., USA	42	RFD	ROCKFORD, ILL., USA

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300 OZ OZARK AIRLINES

43 SOX SIOUX CITY, IOWA, USA
45 SFI SPRINGFIELD, ILL., USA
47 STL ST. LOUIS, MO., USA
49 TUL TULSA, OKLA., USA
51 ALD WATERLOO, IOWA, USA

44 FSD SIOUX FALLS, S.D., USA
46 SGF SPRINGFIELD, MO., USA
48 SQT STERLING/ROCK FALLS, ILL., USA
50 TAD WASHINGTON, DC-DULLES APT., USA

301 PS PACIFIC SOUTHWEST AIRLINES-INTRA-STATE

1 BDN BORDEN, CALIF., USA
3 LGB LONG BEACH, CALIF., USA
5 OAK OAKLAND, CALIF., USA
7 SFO SAN FRANCISCO, CALIF., USA
9 SFO SAN FRANCISCO, CALIF., USA
11 SCK STOCKTON, CALIF., USA

2 FAT FRESNO, CALIF., USA
4 LAX LOS ANGELES, CALIF., USA
6 ONT ONTARIO, CALIF., USA
8 SAN SAN DIEGO, CALIF., USA
10 SJC SAN JOSE, CALIF., USA

302 PW PACIFIC WESTERN AIRLINES

1 MVD BELLA BELLA, B.C., CANADA
3 YVC CALGARY, ALTA., CANADA
5 YBL CAMPBELL RIVER, B.C.
7 YDD CORIX, B.C.
9 YDU DAWSON CREEK, B.C.
11 YEG EDMONTON, ALTA-INT APT, CANADA
13 YMM FT. McMURRAY, ALTA.
15 YFS FT. SIMPSON, NWT
17 YGF GRAND FORKS, B.C.
19 YQJ HIGH LEVEL, ALBERTA
21 YKA KAMLOOPS, B.C.
23 WVN NAWO, B.C., CANADA
25 ZOF OCEAN FALLS, B.C.
27 YPF PENTICTON, B.C.
29 YPW POWELL RIVER, B.C.
31 WPF PRINCE RUPERT, B.C.-DIGBY ISLAND
33 YRD RAINBOW LAKE, ALTA.
35 YZP SANDSPIT, B.C.
37 YYD SMITHERS, B.C.
39 YXT TERRACE, B.C.
41 YBE UMANIUM CITY, SASK.
43 YYJ VICTORIA, B.C.
45 YQY WATKINS, NWT

2 OBC BELLA BELLA, B.C.
4 YCB CAMPBELL BAY, NWT
6 YCG CASTLEGAR, B.C.
8 YXC CROMBIE, B.C.
10 YAD EDMONTON, ALTA., CANADA
12 YPY FT. CHIPWEYAN, ALBERTA
14 YER FT. RESOLUTION, N.W.T.
16 YSM FT. SMITH, N.W.T.
18 YHY HAY RIVER, NWT
20 YEV INUVIK, NWT
22 YCW KELOWNA, B.C.
24 YVQ NORMAN WELLS, NWT
26 YPE PEACE RIVER, ALTA.
28 YZT FORT HARDY, B.C.
30 YXS PRINCE GEORGE, B.C.
32 YQZ QUESNEL, B.C.
34 YRB RESOLUTE BAY, N.W.T.
36 SEA SEATTLE, WASH., USA
38 ZTS TANKS, B.C.
40 YAZ TOLSON, BRITISH COLUMBIA
42 YVR VANCOUVER, B.C., CANADA
44 YWL WILLIAM LAKE, B.C.
46 YZF YELLOWKNIFE, N.W.T.

303 PK PAKISTAN INTERNATIONAL

1 AOR ADD ABAB, THOCTHE DRAM
3 AMS AMSTERDAM, NETHERLANDS
5 BOM BOMBAY, INDIA
7 BKK BANGKOK, THAILAND
9 CAI CAIRO, ARAB REP OF EGYPT
11 CMB COLOMBO, REP. OF SRI LANKA
13 DAR DAR ES SALAM, TANZANIA
15 DHA DHAHRAN, SAUDI ARABIA

2 ADL ADD, REP. OF YEMEN
4 ATH ATHENS, GREECE
6 BAH BAHRAIN IS., ARABIAN GULF
8 BEY BEIRUT, LEBANON
10 CJI CHITRAL, PAKISTAN
12 DAM DAMASCUS, ARAB REP OF SYRIA
14 DSK DERA ISMAIL, PAKISTAN
16 DOH DOHA, QATAR, ARABIA

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308 EB PENNSYLVANIA COMMUTER-AIR TAXI

3 MDT HARRISBURG, PA-INTERNATIONAL ARPT.
5 SCE STATE COLLEGE, PA., USA

4 LMS LANCASTER, PA., USA
6 DCA WASHINGTON, DC-NATIONAL ARPT., USA

309 PH PHILIPPINE AIRLINES

1 AMS AMSTERDAM, NETHERLANDS
3 BCD DAVAO, PHILIPPINE IS.
5 BKK BANGKOK, THAILAND
7 BPH BISELIG, PHILIPPINE IS.
9 CGY CAGAYAN DE ORIO, PHILIPPINE IS.
11 CDM CATAGMAN, PHILIPPINE IS.
13 CLB CEBU, PHILIPPINE IS.
15 DVO DAVAO, PHILIPPINE IS.
17 FRA FRANKFURT, GERMANY
19 HKG HONG KONG, BR. CROWN COLONY
21 IGN ILIGAN, PHILIPPINE IS.
23 KHI KARACHI, PAKISTAN
25 MNL MANILA, PHILIPPINE IS.
27 WNP NAGA, PHILIPPINE IS.
29 PPS PUERTO PRINCESA, PHILIPPINE IS.
31 SFO SAN FRANCISCO, CALIF., USA
33 SIN SINGAPORE, SINGAPORE
35 SYD SYDNEY, NSW AUSTRALIA
37 TPE TAIPEI, REP. OF CHINA (TAIWAN)
39 TUG TUGUEGARAO, PHILIPPINE IS.
41 ZAM ZAMBOANGA, PHILIPPINE IS.

2 APR APARRI, PHILIPPINE IS.
4 BAG BAGUIO, PHILIPPINE IS.
6 BGD BANGAL, PHILIPPINE IS.
8 BKO BODON, PHILIPPINE IS.
10 CYP CALBAYOG, PHILIPPINE IS.
12 CYZ CAGAYAN, PHILIPPINE IS.
14 CBU COTABATO, PHILIPPINE IS.
16 DGT DUMAGUETE, PHILIPPINE IS.
18 RES GENERAL SANTOS, PHILIPPINE IS.
20 HNL HONOLULU, OAHU, HAWAII, USA
22 ILO ILOILO, PHILIPPINE IS.
24 LSP LEGASPI, PHILIPPINE IS.
26 MEL MELBOURNE, VIC., AUSTRALIA
28 OZC OZAMIS CITY, PHILIPPINE IS.
30 FCO ROME, ITALY-LEONARDO DA VINCI ARPT
32 SJI SAN JOSE, PHILIPPINE IS.
34 SUG SURIGAO, PHILIPPINE IS.
36 TAC TACLOBAN, PHILIPPINE IS.
38 HND TOKYO, JAPAN-HANEDA AIRPORT
40 VRC VIRAC, PHILIPPINE IS.

310 PP PHILLIPS AIRLINES

1 ORD CHICAGO, ILL-OHARE ARPT, USA.
3 VPZ VALPARAISO, IND., USA

2 MGC MICHIGAN CITY, IND., USA

311 FR PHILLIPS FLYING SERVICE INC.

1 MVD MACKINAC ISLAND, MICH., USA

2 PEN PELLSTON, MICH., USA

312 PI PIEDMONT AVIATION

1 AVL ASHEVILLE, N.C., USA
3 AGS AUGUSTA, GA., USA
5 BKW BECKLEY, W. VA., USA
7 CHS CHARLESTON, S.C., USA
9 CLT CHARLOTTE, N.C., USA
11 MDW CHICAGO, ILL-MIDWAY ARPT, USA.
13 CAE COLUMBIA, S.C., USA
15 DAN DANVILLE, VA., USA
17 FLD FLORENCE, S.C., USA
19 LVB GREENSBORO, N. VA., USA
21 GSP GREENVILLE/SPARTANBURG, SC, USA
23 HSP HOT SPRINGS, VA., USA
25 JAX JACKSONVILLE, N.C., USA
27 TYS KNOXVILLE, TENN., USA

2 ATL ATLANTA, GA., USA
4 BAL BALTIMORE, MD., USA
6 BFB BLUEFIELD, W. VA., USA
8 CRW CHARLESTON, W. VA., USA
10 CHU CHARLOTTESVILLE, VA., USA
12 CVG CINCINNATI, OHIO, USA
14 CMH COLUMBUS, OHIO, USA
16 FAY FAYETTEVILLE, N.C., USA
18 GSB GOLDSBORO, N.C., USA
20 GSO GREENSBORO, N.C., USA
22 HKY HICKORY, N.C., USA
24 HIX HUNTINGTON, W. VA., USA
26 ISO KINSTON, N.C., USA
28 LEX LEXINGTON, KY., USA

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OF POOR QUALITY

312 P1 PIEDMONT AVIATION

29 LOZ LONDON, KY., USA

31 LYH LYNCHBURG, VA., USA

33 CRE MYRTLE BEACH, S.C., USA

35 EMN NEW BERN, N.C., USA

37 EWR NEW YORK, NY-NEWARK ARPT., USA

39 ORF NORFOLK, VA., USA

41 RDU RALEIGH/DURHAM, N.C., USA

43 ROA ROANOKE, VA., USA

45 SHD STAUNTON, VA., USA

47 IAD WASHINGTON, DC-DULLES ARPT., USA

49 TLM WILMINGTON, N.C., USA

30 SDF LOUISVILLE, KY., USA

32 MEM MEMPHIS, TENN., USA

34 BNA NASHVILLE, TENN., USA

36 LGA NEW YORK, NY-LA GUARDIA ARPT., USA

38 FHE NEWPORT NEWS, VA., USA

40 PKB PARKERSBURG, W. VA., USA

42 RIC RICHMOND, VA., USA

44 RWI ROCKY MOUNT/WILSON, N.C., USA

46 TRI TRI-CITY AIRPORT, TENN., USA

48 DCA WASHINGTON, DC-NATIONAL ARPT., USA

50 INT WINSTON SALEM, N.C., USA

313 PM PILGRIM-AIR-TAXI

1 ALB ALBANY, N.Y., USA

3 BDR BRIDGEPORT, CONN., USA

5 HVN NEW HAVEN, CONN., USA

7 JFK NEW YORK, NY-KENNEDY INT ARPT., USA

2 BOS BOSTON, MASS., USA

4 BDL HARTFORD, CONN., USA

6 RON NEW LONDON, CONN., USA

314 NN PINEHURST AIRLINES INC.

1 CCI CHARLOTTE, N.C., USA

3 RDU RALEIGH/DURHAM, N.C., USA

2 NSS PINEHURST, N.C., USA

315 PU PEDRA

1 AUJ ARTIGAS, URUGUAY

3 BUV BELLA UNION, URUGUAY

5 MVD MONTEVIDEO, URUGUAY

7 PDP PUNTA DEL ESTE, URUGUAY

9 STY SALTO, URUGUAY

2 ASU ASUNCION, PARAGUAY

4 AEP BUENOS AIRES, ARG-AREOPARQUE ARPT

6 PBO PAYSANDU, URUGUAY

8 RVY RIVERA, URUGUAY

10 VCH VICHADERO, URUGUAY

316 LO POLISH AIRLINES

1 AMS AMSTERDAM, NETHERLANDS

3 BGN BAGHDAD, IRAQ

5 BEG BELGRADE, YUGOSLAVIA

7 BRU BRUSSELS, BELGIUM

9 BUD BUDAPEST, HUNGARY

11 CAI CAIRO, ARAB REP OF EGYPT

13 CPH COPENHAGEN, DENMARK

15 DBV DOBRIVOLIK, YUGOSLAVIA

17 GDN GDANSK, POLAND

19 HAM HAMBURG, GERMANY

21 IST ISTANBUL, TURKEY

23 KEV KIEV, USSR

25 KKK KRAKOW, POLAND

27 LHR LONDON, ENGLAND-HEATHROW ARPT

29 LIN MILAN, ITALY-FORLANINI-LINATE

31 JFK NEW YORK, NY-KENNEDY INT ARPT., USA

33 LBG PARIS, FRANCE-LE BOURGET ARPT

35 PRG PRAGUE, CZECHOSLOVAKIA

2 ATH ATHENS, GREECE

4 BEY BEIRUT, LEBANON

6 SXF BERLIN, GER. DEM. REP.

8 OTP BUCHAREST, ROM-OTOPENI ARPT

10 BZG BYDGOSZCZ, POLAND

12 CND CONSTANTA, ROMANIA

14 DAM DAMASCUS, ARAB REP OF SYRIA

16 FRA FRANKFURT, GERMANY

18 GVA GENEVA, SWITZERLAND

20 HEL HELSINKI, FINLAND

22 KTN KATOWICE, POLAND

24 OSZ KOSZALIN, POLAND

26 LEO LENINGRAD, USSR

28 MAD MADRID, SPAIN

30 SVB MOSCOW, USSR-SHEREMETYEVO ARPT

32 NIC NICOSIA, CYPRUS

34 POZ POZNAN, POLAND

36 RJK RIJKA, YUGOSLAVIA

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359	SA	SOUTH AFRICAN AIRWAYS	28	MRH	MAURITIUS, INDIAN OCEAN
27	MSH	MASERU, LESOTHO	30	QDH	QUDISHOORN, REP OF S AFRICA
29	JFK	NEW YORK, NY-KENNEDY INT ARPT, USA	32	PER	PERTH, W AUSTRALIA
31	ORY	PARIS, FRANCE-ORLY ARPT	34	PIZ	PORT ELIZABETH, REP OF S AFRICA
33	PBZ	PIETTERBERG, REP OF S AFRICA	36	FCO	ROME, ITALY-LIONARDO DA VINCI ARPT
35	GIG	RIO DE JANEIRO, BRA-GALEAO ARPT	38	SAY	SALISBURY, RHODESIA
37	SID	SAL ISLAND, CAPE VERDE IS	40	IVT	TANANARIVE, MAD REP-IVATO APT
39	SYD	SYDNEY, NSW AUSTRALIA	42	VIE	VIENNA, AUSTRIA
41	DTN	DTIN, REP OF S AFRICA	44	ZRH	ZURICH, SWITZERLAND
43	WDH	WINDHOEK, S. W. AFRICA			
360	SL	SOUTHERN AIRLINES, INC.-AIR TAXI			
1	EYN	KEY WEST, FLA., USA	2	MTH	MARATHON, FLA., USA
3	MIA	MIAMI, FLA., USA			
361	YC	SOUTHEAST COMPUTER AIRLINES			
1	BHM	BIRMINGHAM, ALA., USA	2	MOB	MOBILE, ALA., USA
3	MTG	MONTGOMERY, ALA., USA			
362	SO	SOUTHERN AIRWAYS			
1	ABY	ALBANY, GA., USA	2	AND	ANDERSON, S.C., USA
3	ANB	ANNISTON, ALA., USA	4	ARN	ATHENS, GA., USA
5	ATL	ATLANTA, GA., USA	6	BTR	BATON ROUGE, LA., USA
7	BHM	BIRMINGHAM, ALA., USA	8	CHS	CHARLESTON, S.C., USA
9	CLT	CHARLOTTE, N.C., USA	10	CHA	CHATTANOOGA, TENN., USA
11	MDW	CHICAGO, ILL-MIDWAY ARPT, USA	12	CAE	COLUMBIA, S.C., USA
13	CSG	COLUMBUS, GA., USA	14	GTR	COLUMBUS, MISS., USA
15	CSV	CROSSVILLE, TENN., USA	16	DHN	DOTHAN, ALA., USA
17	VPS	ERLIN A.F. BASE, FLA., USA	18	GAD	GADSDEN, ALA., USA
19	GGP	GREENVILLE/SPARTANBURG, SC, USA	20	GLH	GREENVILLE, MISS., USA
21	GMD	GREENWOOD, MISS., USA	22	GRD	GREENWOOD, S.C., USA
23	GPT	GULFPORT/BILLOXI, MISS., USA	24	HBB	HATTIESBURG, MISS., USA
25	HNV	HUNTSVILLE/DECATUR, ALA., USA	26	JAX	JACKSON/VICKSBURG, MISS., USA
27	MKL	JACKSON, TENN., USA	28	JAX	JACKSONVILLE, FLA., USA
29	TYS	KNOXVILLE, TENN., USA	30	LUL	LAUREL, MISS., USA
31	MEM	MEMPHIS, TENN., USA	32	MEI	MERIDIAN, MISS., USA
33	MIA	MIAMI, FLA., USA	34	MOB	MOBILE, ALA., USA
35	MLD	MONROE, LA., USA	36	MTG	MONTGOMERY, ALA., USA
37	MGR	MOULTRIE/THOMASVILLE, GA., USA	38	MSL	MUSCLE SHOALS, ALA., USA
39	BNA	NASHVILLE, TENN., USA	40	HEZ	NATCHEZ, MISS., USA
41	MSY	NEW ORLEANS, LA., USA	42	LGA	NEW YORK, NY-LA GUARDIA ARPT, USA
43	EDR	NEW YORK, NY-NEWARK ARPT, USA	44	ORF	ORLANDO, FLA., USA
45	PFN	PANAMA CITY, FLA., USA	46	SVI	SHELBYVILLE, TENN., USA
47	STL	ST. LOUIS, MO., USA	48	TLH	TALLAHASSEE, FLA., USA
49	TRI	TRI-CITY AIRPORT, TENN., USA	50	TOP	TOPEKA, MISS., USA
51	TCL	TUSCALOOSA, ALA., USA	52	UOX	UNIVERSITY, MISS., USA
53	VLD	VALDOSTA, GA., USA	54	WFO	WASHINGTON, DC-DULLES ARPT, USA

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381	TX	TEXAS INTERNATIONAL AIRLINES, INC			
1	ABT	ABILENE, TEXAS, USA	2	ABQ	ALBUQUERQUE, N.M., USA
3	ESF	ALEXANDRIA, LA., USA	4	AMA	AMARILLO, TEXAS, USA
5	AUS	AUSTIN, TEXAS, USA	6	BIR	BATON ROUGE, LA., USA
7	RPT	BEAUMONT/PT. ARTHUR, TEX., USA	8	HSA	BIG SPRING, TEXAS, USA
9	BWD	BROWNSWOOD, TEXAS, USA	10	CMP	CARLSBAD, N.M., USA
11	CVN	CLOVIS, N.M., USA	12	CRP	CORPUS CHRISTI, TEXAS, USA
13	DAI	DALLAS/FT. WORTH, TEXAS, USA	14	DEN	DENVER, COLO., USA
15	ELU	EL DORADO/CAMDEN, ARK., USA	16	ELP	EL PASO, TEXAS, USA
17	HRL	HARLINGEN, TEXAS, USA	18	HOB	HOBBS, N.M., USA
19	HOT	HOT SPRINGS, ARK., USA	20	IAH	HOUSTON, TEXAS, USA
21	JAW	JACKSON/VICKSBURG, MISS., USA	22	JBR	JONESBORO, ARK., USA
23	LFT	LAFAYETTE, LA., USA	24	LCH	LAKE CHARLES, LA., USA
25	LOI	LAREDO, TEXAS, USA	26	LIT	LITTLE ROCK, ARK., USA
27	UGG	LUNGVILLE, TEXAS, USA	28	LAX	LOS ANGELES, CALIF., USA
29	LBB	LUBBOCK, TEXAS, USA	30	LFK	LUFKIN, TEXAS, USA
31	MEF	MC ALLEN, TEXAS, USA	32	MEM	MEMPHIS, TENN., USA
33	MLX	MEXICO CITY, MEXICO	34	MDF	MIDLAND, TEXAS, USA
35	MLU	MINNIE, LA., USA	36	MTY	MONTERREY, MEXICO
37	MSY	NEW ORLEANS, LA., USA	38	PBF	PINE BLUFF, ARK., USA
39	ROW	ROSWELL, N.M., USA	40	SJC	SALT LAKE CITY, UTAH, USA
41	SJT	SAN ANGELO, TEXAS, USA	42	SAT	SAN ANTONIO, TEX., USA
43	SHV	SHEVEPORT, LA., USA	44	TPL	TEMPLE, TEXAS, USA
45	TAK	TEXARKANA, ARK., USA	46	TYR	TYLER, TEXAS, USA
47	ACT	WACO, TEXAS, USA	48	SPS	WICHITA FALLS, TEXAS, USA
382	TH	THAI AIRWAYS COMPANY			
1	BAQ	BAN MAK KHAENG, THAILAND	2	BKK	BANGKOK, THAILAND
3	CNX	CHIANG MAI, THAILAND	4	CEI	CHIANG RAI, THAILAND
5	KKC	KHON KAEN, THAILAND	6	LPT	LAMPANG, THAILAND
7	LOE	LOEI, THAILAND	8	HGN	MAE HONGSON, THAILAND
9	KUP	NAKHON PHANOM, THAILAND	10	NVT	NAN, THAILAND
11	PTD	PHITRANG, THAILAND	12	TTN	TENANG, MALAYSIA
13	PHS	PHITSANULOK, THAILAND	14	HKI	PHUKET, THAILAND
15	PLU	PHU, THAILAND	16	SNO	SAKON NAKHON, THAILAND
17	SGZ	SINGORA, THAILAND	18	TKI	TAI, THAILAND
19	TST	TRANG, THAILAND	20	UBP	UBOL, THAILAND
21	UTR	UTTARADIT, THAILAND	22	VTE	VIENTIANE, LAOS
383	TG	THAI AIRWAYS INTERNATIONAL			
1	BKK	BANGKOK, THAILAND	2	CCU	CALCUTTA, INDIA
3	CPH	COPENHAGEN, DENMARK	4	DAC	DACCA, BANGLADESH
5	DEL	DELHI, INDIA	6	DPS	DENPASAR, BALI, INDONESIA
7	HKG	HONG KONG, BR CROWN COLONY	8	JKT	JAKARTA, JAVA, INDONESIA
9	KTM	KATHMANDU, NEPAL	10	KUL	KUALA LUMPUR, MALAYSIA
11	MNL	MANILA, PHILIPPINE IS	12	OSA	OSAKA, JAPAN
13	BNH	PENANG, MALAYSIA-BUTTERNORTH ARPT.	14	RGN	RANGOON, BURMA
15	SGN	SAIGON, S VIETNAM	16	SIN	SINGAPORE, SINGAPORE
17	SYD	SYDNEY, NSW AUSTRALIA	18	TPE	TAIPEI, REP. OF CHINA (TAIWAN)

TABLE B-18
U.S. REGIONAL AIRLINES
AIRPORT DATA
(1972)

CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION(FT)	NORMAL MAX TEMP(°F)	EXISTING RUNWAY LENGTH(FT.)	GRADIENT (SLOPES)
ABERDEEN	ABR	ABERDEEN MUNI.	S.D.	NC	1,301	86	6,900	.05
ABILENE	ABI	ABILENE MUNI.	TEXAS	TT	1,789	94	7,199	.39
AKRON/CANTON	CAK	AKRON-CANTON	OHIO	AL	1,228	83	6,398	.23
ALAMOGORDO	ALM	ALAMOGORDO MUNI	N.M.	FL	4,197	94	7,005	.80
ALAMOSA	ALS	ALAMOSA MUNI.	COLO.	FL	7,535	82	7,872	.05
ALBANY	ABY	ALBANY-DOUGHERTY CO.	GA.	SO	196	94	6,601	.10
ALBANY	ALB	ALBANY CO.	N.Y.	AL	288	84	6,000	.21
ALBUQUERQUE	ABQ	ALBUQUERQUE SUNPORT	N.M.	FL,TT	5,352	93	13,373	.16
ALEXANDRIA	ESF	ESLER FIELD	LA.	TT	108	95	5,999	.07
ALLENTOWN	ABE	ALLENTOWN-BETHLEHEM-EASTON	PA.	AL	388	85	6,185	.18
ALLIANCE	AIA	ALLIANCE MUNI	NEBR	FL	3,930	89	9,201	.05
ALPENA	APN	PHELPS COLLINS	MICH.	NC	689	70	9,000	.04
ALTOONA/MARTINSBURG	AOO	BLAIR CO.	PA.	AL	1,504	81	5,465	.67
AMARILLO	AMA	AMARILLO AIR TERMINAL	TEXAS	FL,TT	3,605	93	13,500	.03
ANDERSON	AND	ANDERSON CO.	S.C.	SO	782	92	5,001	.10
ANNISTON	ANB	ANNISTON-CALHOUN COUNTY	ALA.	SO	611	92	5,009	.34
APPLE VALLEY	APV	APPLE VALLEY/NEW	CALIF.	RW	3,059	99	6,498	1.5
ASHEVILLE	AVL	ASHEVILLE MUNI.	N.C.	PI	2,162	85	6,500	.78
ATHENS	AHN	ATHENS MUNI.	GA.	SO	807	91	4,992	.96
ATLANTA	ATL	W.B. HARTSFIELD ATLANTA INT.	G.A.	PI,SO	1,026	90	10,000	.55
ATLANTIC CITY	AIY	ATLANTIC CITY MUNI.	N.J.	AL	11	82	2,950	.04
ASTORIA	AST	CLATSOP	ORE.	RW	11	69	5,796	.05
AUGUSTA	AGS	BUSH FIELD	GA.	PI	145	93	8,000	.15
AUSTIN	AUS	ROBERT MUELLER MUNI.	TEXAS	TT	632	96	7,270	.77
BAKERSFIELD	BFL	MEADOWS FIELD	CALIF.	RW	491	102	6,708	.28
BALTIMORE	BAL	BALTIMORE-WASH. INTL.	MD.	PI,AL	146	85	9,500	.12
BARTLESVILLE	BVO	FRANK PHILLIPS	OKLA.	FL	715	95	6,200	.56
BATON ROUGE	BTR	RYAN	LA	TT,SO	70	92	6,000	.08
BEAUMONT/PORT ARTHUR	BPT	JEFFERSON CO.	TEXAS	TT	16	93	6,751	.12
BECKLEY	BKW	RALEIGH CO. MEM'L	W.VA.	PI	2,504	87	5,000	.44
BEMIDJI	BJI	BEMIDJI MUNI	MINN.	NC	1,389	79	5,700	.14
BENTON HARBOR	BEH	ROSS FIELD	MICH.	NC	643	82	5,107	.29
BIG SPRING	HCA	HOWARD CO.	TEXAS	TT	2,564	95	5,494	.62

U.S. REGIONAL AIRLINES
AIRPORT DATA
(1972)

CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION(FT)	NORMAL MAX TEMP(°F)	EXISTING RUNWAY LENGTH(FT)	GRADIENT (SLOPE)
BILLINGS	BIL	LOGAN FIELD	MONT	FL	3,606	87	8,600	.93
BINGHAMTON	BGM	BROOME CO.	N.Y.	AL	1,629	80	6,299	1.0
BIRMINGHAM	BHM	BIRMINGHAM MUNI.	ALA.	SO	643	91	10,000	.26
BISMARCK	BIS	BISMARCK MUNI.	N.D.	NC,FR	1,677	85	6,921	.18
BLOOMINGTON	BMI	BLOOMINGTON-NORMAL	ILL.	OZ	875	88	6,500	.09
BLOOMINGTON	BMG	MONROE CO.	IND.	AL	847	88	5,202	.12
BLYTHE	BLH	BLYTHE	CALIF.	RW	397	109	6,479	.03
BOISE	BOI	BOISE AIR TERMINAL	IDAHO	RW	2,858	90	8,993	.37
BOSTON	BOS	GEN'L E.L. LOGAN INT'L	MASS.	AL	19	82	10,080	.04
BOZEMAN	BZN	GALLATIN FIELD	MONT.	FL	4,458	76	9,000	.43
BRADFORD	BFD	BRADFORD REGIONAL	PA.	AL	2,143	83	6,499	.29
BRAINERD	BRD	BRAINERD-CROWN WING CO.	MINN.	NC	1,226	81	5,000	.03
BRIDGEPORT	BDR	IGOR SIKORSKI MEMORIAL	CONN.	AL	9	83	4,761	.04
BRISTOL	TRI	TRI CITY	TENN.	PI,SO	1,519	85	6,600	.44
BROOKINGS	BKX	BROOKINGS MUNI.	S.D.	NC	1,637	85	5,431	.41
BROWNWOOD	BWD	BROWNWOOD MUNI.	TEXAS	TT	1,386	98	5,598	.33
BUFFALO	BUF	GREATER BUFFALO INT'L	N.Y.	AL	723	70	8,100	.61
BURBANK	BUR	HOLLYWOOD-BURBANK	CALIF.	RW,PSA	775	88	6,955	1.24
BURLINGTON	BRL	BURLINGTON MUNI.	IOWA	OZ	697	87	6,702	.28
BURLINGTON	BTB	BURLINGTON INT'L	VT.	AL	335	82	7,807	.33
CAPE GIRARDEAU	CGI	CAPE GIRARDEAU MUNI.	MO.	OZ	342	91	6,499	.07
WILDWOOD	WWD	CAPE MAY CO.	N.J.	AL	22	81	5,000	.05
CARLSBAD	CNM	CAVERN CITY AIR TRML	N.M.	TT	3,276	96	6,670	.54
CASPER	CPR	NATRONA CO. INT'L.	WYO	FL	5,348	90	9,061	.30
CEDAR CITY	CDC	CEDAR CITY MUNI.	UTAH	RW	5,622	90	6,100	.19
CEDAR RAPIDS	CID	CEDAR RAPIDS MUNI.	IOWA	OZ	863	87	7,000	.14
CHADRON	CDR	CHADRON MUNI.	NEBR.	FL	3,295	89	6,000	.49
CHAMPAIGN	CMI	U. OF ILL.-WILLARD	ILL.	OZ	754	86	6,500	.14
CHARLESTON	CRW	KANAWHA	W.VA.	PI,AL	982	87	6,303	.92
CHARLESTON	CHS	CHARLESTON AFB MUNI.	S. CAR.	PI,SO	45	89	9,000	.11
CHARLOTTE	CLT	DOUGLAS MUNI.	N.C.	PI,SO	748	88	7,845	.32
CHARLOTTESVILLE	CHO	CHARLOTTESVILLE-ALBERMARLE	VA.	PI	640	76	6,000	.32
CHATTANOOGA	CHA	LOVELL FIELD	TENN.	SO	682	90	7,400	.27

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CHEYENNE	CYS	CHEYENNE MUNI.	WYO.	FL	6,156	82	9,201	.59
CHICAGO	MDW	CHICAGO-MIDWAY	ILL.	OZ,NC,PI,SO,AL	619	84	6,519	.09
CHICAGO	ORD	CHICAGO O HARE INT'L	ILL.	OZ NC, AL	667	84	11,600	.14
CHICO	CIC	CHICO MUNI.	CALIF.	RW	238	98	6,722	.48
CINCINNATI	CVG	COVINGTON-CINCINNATI	OHIO	NC,PI,AL	890	85	9,501	.37
CLARKSBURG	CKB	BENEDUM	W.VA.	AL	1,203	86	5,200	.38
CLARKSVILLE	CKV	OUTLAW FIELD	TENN.	OZ	550	92	5,000	.50
CLEVELAND	CLE	CLEVELAND-HOPKINS INT'L	OHIO	NC,AL	792	83	9,000	.25
CLINTON	CWI	CLINTON MUNI	IOWA	OZ	707	87	5,204	.28
CLOVIS	CVN	CLOVIS MUNI.	N. MEX.	TT	4,214	91	5,690	.45
CODY	COD	CODY MUNI.	WYO.	FL	5,089	86	7,107	.31
COLLEGE STA.	CLL	EASTERWOOD FIELD	TEXAS	TT	319	97	5,161	.15
COLORADO SPRINGS	COS	PETERSON FIELD	COLO.	FL	6,172	84	11,013	1.19
COLUMBIA	COU	COLUMBIA REGIONAL	MO.	OZ	889	89	6,499	.11
COLUMBIA	CAE	COLUMBIA METRO.	S.C.	PI,SO	236	92	7,551	.27
COLUMBUS	CSG	COLUMBUS METRO.	GA.	SO	397	92	7,000	.14
COLUMBUS	GTR	GOLDEN TRIANGLE REGIONAL	MISS.	SO	263	93	6,497	.15
COLUMBUS	OLU	COLUMBUS MUNI.	NEBR.	FL	1,443	90	5,002	.07
COLUMBUS	CMH	PORT COLUMBUS INT'L	OHIO	NC,PI,AL	816	86	10,700	.10
CORPUS CHRISTI	CRP	CORPUS CHRISTI INT'L	TEXAS	TT	43	94	7,500	.05
CORTEZ	CEZ	CORTEZ-MONTEZUMA CO.	COLO.	FL	5,914	89	7,205	.13
CORVALLIS	CVD	CORVALLIS MUNI.	ORE.	RW	246	81	5,067	.12
CRESCENT CITY	CEC	JACK McNAMARA FIELD	CALIF.	RW	57	67	5,000	.14
DALLAS	DAL	DALLAS LOVE FIELD	TEXAS	OZ,FL,TT	487	95	8,800	.03
DANVILLE	DNV	VERMILION CO.	ILL.	AL	695	87	5,400	.82
DANVILLE	DAN	DANVILLE MUNI.	VA.	PI	582	87	5,000	.40
DAYTON	DAY	J.M. COX DAYTON MUNI.	OHIO	NC,AL	1,008	88	9,500	.02
DECATUR	DEC	DECATUR	ILL.	OZ	679	89	6,500	.07
DENVER	DEN	STAPLETON INT'L	COLO.	NC,FL,TT,OZ	5,331	87	11,500	.42
DES MOINES	DSM	DES MOINES MUNI.	IOWA	OZ	957	86	9,000	.51
DETROIT	DTW	DETROIT METRO. WAYNE CO.	MICH.	NC,AL	639	84	10,500	.02
DEVILS LAKE	DVL	DEVILS LAKE MUNI.	N.D.	NC	1,454	81	5509	.22
DOTHAN	DHN	DOTHAN	ALA.	SO	401	92	8,500	.64
DU BOIS	DUJ	DU BOIS-JEFFERSON CO.	PA.	AL	1,817	86	5,505	.45
DUBUQUE	DBQ	DUBUQUE MUNI.	IOWA	OZ	1,076	84	6,500	.24
DULUTH	DLH	DULUTH INT'L	MINN	NC	1,429	77	10,154	.05

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EAU CLAIRE	EAU	EAU CLAIRE MUNI.	WISC.	NC	906	82	7,299	.30
EL CENTRO	IPL	IMPERIAL COUNTY	CALIF.	RW	-56	107	5,305	.05
ELDORADO/CAMDEN	ELD	GOODWIN FIELD	ARK.	TT	277	94	5,099	.24
EL PASO	ELP	EL PASO INT'L	TEXAS	FL,TT	3,956	95	12,103	.22
EGLIN	VPS	EGLIN AFB	FLA.	SO	85	89	12,000	.28
ELKINS	EKN	ELKINS-RANDOLPH CO.	W.VA.	AL	1,987	78	4,542	1.04
ELMIRA	ELM	CHEMUNG CO.	N.Y.	AL	951	83	5,604	.22
ENID	WDG	ENID WOODRING MUNI.	OKLA.	FL	1,167	95	6,503	.35
EPHRATA	EPH	EPHRATA MUNI	WASH.	RW	1,272	90	7,300	.16
ERIE	ERI	ERIE INT'L	PA.	AL	732	80	6,000	.04
ESCANABA	ESC	DELTA CO.	MICH.	NC	609	75	6,498	.25
EUGENE	EUG	MAHLON SWEET FIELD	ORE.	RW	365	82	6,200	.09
EUREKA/ARCATA	ACV	ARCATA/EUREKA	CALIF.	RW	218	61	5,999	.66
EVANSVILLE	EVV	EVANSVILLE DRESS REG.	IND.	AL	418	92	8,021	.44
FAIRMONT	FRM	FAIRMONT MUNI.	MINN.	NC	1,161	84	5,002	.09
FARGO	FAR	HECTOR FIELD	N.D.	NC	900	84	9,151	.02
FARMINGTON	FMN	FARMINGTON MUNI.	N.M.	FL	5,503	92	6,700	.42
FAYETTEVILLE	FYV	DRAKE FIELD	ARK.	FL	1,251	90	6,006	.26
FLAGSTAFF	FLG	PULLIAM	ARIZ	FL	7,012	81	7,000	.26
FLINT	FNT	BISHOP	MICH.	NC	781	82	7,199	.02
FLORENCE	FLO	FLORENCE MUNI.	S.C.	PI	147	90	6,500	.38
FORT DODGE	FOD	FORT DODGE MUNI.	IOWA	OZ	1,162	87	4,400	.46
FORT LEONARD WOOD	TBN	FORNEY AAF	MO.	OZ,FL	11,57	88	5,037	.18
FORT SMITH	FSM	FORT SMITH MUNI.	ARK.	FL	468	95	8,000	.34
FRANKLIN	FKL	CHESS-LAMBERTON	PA.	AL	1,540	83	5,200	.25
FRESNO	FAT	FRESNO AIR TERMINAL	CALIF.	RW	332	99	9,218	.04
GADSDEN	GAD	GADSEN	ALA.	SO	564	92	4,815	.31
GALESBURG	GBG	GALESBURG MUNI.	ILL.	OZ	764	86	5,794	.18
GALLUP	GUP	SENATOR CLARKE FIELD	N.M.	FL	6,468	88	6,300	.17
GALVESTON	GLS	SCHOLES FIELD	TEXAS	TT	7	89	6,000	.03
GARDEN CITY	GCK	GARDEN CITY MUNI.	KAN	FL	2,895	94	6,000	.17
GLASGOW	GGW	GLASGOW INT'L	MONT.	FL	2,293	87	6,007	.15
GLEN DIVE	GDV	DAWSON COMMUNITY	MONT.	FL	2,457	89	5,700	.10
GOLDSBORO	GSB	GOLDSBORO-WAYNE MUNI	N.C.	PI	133	92	3,698	0
GOODLAND	GLD	RENNER FLD./GOODLAND MUN	KAN	FL	3,657	92	5,550	.16

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U.S. REGIONAL AIRLINES
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CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION (FT)	NORMAL MAX TEMP (°F)	EXISTING RUNWAY LENGTH (FT)	GRADIENT (SLOPE)
GRAND CANYON	GCN	GRAND CANYON NAT'L PARK	AIRZ.	RW	6,605	86	9,000	.81
GRAND FORKS	GFK	GRAND FORKS INT'L	N.D.	NC	843	83	7,350	.05
GRAND ISLAND	GRI	GRAND ISLAND AIR PARK	NEBR.	FL	1,846	91	7,189	.10
GRAND JUNCTION	GJT	WALKER FIELD	COLO.	FL	4,857	93	10,500	.34
GRAND RAPIDS	GRR	KENT CO.	MICH.	NC,AL	793	83	6,600	.06
GREAT FALLS	GTF	GREAT FALLS INT'L	MONT.	FL,RW	3,674	83	10,500	.18
GREEN BAY	GRB	AUSTIN-STRAUBEL FIELD	WISC.	NC	694	80	7,700	.17
GREENBRIER/LEWISBURG	LWD	GREENBRIER VALLEY	W.VA.	PI	2,301	85	6,000	.35
GREENSBORO	GSO	GREENSBORO-HIGH POINT	N.C.	PI	926	87	8,201	.18
GREENVILLE	GLH	GREENVILLE MUNI.	MISS.	SO	131	93	7,018	.04
GREENVILLE/SPARTANBURG	GSP	GREENVILLE/SPARTANBURG	S.C.	PI	972	90	7,600	.20
GREENWOOD	GWO	GREENWOOD-LEFLORE	MISS.	SO	155	93	4,996	.10
GREENWOOD	GRD	GREENWOOD CO.	S.C.	SO	631	92	5,212	.27
GUADALAJARA	GDL	DON MIGUEL HIDALGO	MEXICO	RW	5,007	83	13,120	—
GULFPORT/BILOXI	GPT	GULFPORT MUNI.	MISS.	SO	28	91	9,000	.10
GUNNISON	GUC	GUNNISON COUNTY	COLO.	FL	7,660	83	7,200	.29
HAGERSTOWN	HGR	HAGERSTOWN REGIONAL	MD.	AL	704	87	5,449	.77
HANCOCK	CMX	HOUGHTON CO MEM'L	MICH	NC	1,091	75	6,500	.55
HARLINGTON	HRL	HARLINGTON INDUST. AIRPT.	TEXAS	TT	35	98	6,349	.03
HARRISBURG	MDT	HARRISBURG INT'L-OLMSTED	PA.	AL	308	36	8,010	.09
HARRISON	HRO	BOONE COUNTY	ARK.	FL	1,374	92	5,659	.27
HARTFORD	BDL	BRADLEY INT'L	CONN.	AL	173	83	9,501	.13
HASTINGS	HSI	HASTINGS MUNI.	NEBR.	FL	1954	91	5,600	.29
HAVRE	HVR	HAVRE CITY-CO.	MONT.	FL	2,584	85	5,200	.11
HATTIESBURG	HBG	HATTIESBURG MUNI.	MISS.	SO	151	93	6,219	.14
HAYS	HYS	HAYS MUNI.	KAN.	FL	1,998	93	5,700	.20
HAZLETON	HZL	HAZLETON MUNI.	PA.	AL	1604	80	4,900	.10
HIBBING	HIB	CHISHOLM-HIBBING	MINN.	NC	1,352	79	6,660	.22
HICKORY	HKY	HICKORY MUNI.	N.C.	PI	1,189	89	6,402	.83
HOBBS	HOB	LEA CO./HOBBS	N.M.	TT	3,659	95	7,399	.12
HOQUIAM	HQM	BOWERMAN	WASH.	RW	14	69	5,000	.04
HOT SPRINGS	HOT	MEMORIAL FIELD	ARK.	FL,TT	535	95	6,096	.57
HOUSTON	IAH	HOUSTON INT'L	TEXAS	TT	98	92	9,401	.04
HUNTINGTON	HTS	TRISTATE/WALKER-LONGED.	W.VA.	PI,AL	828	88	5,281	0
HUNTSVILLE/DECATUR	HSV	HUNTSVILLE-MADISON JETPT.	ALA.	SO	629	92	8,000	.14
HURON	HON	W.W. HOWES MUNI	S.D.	N.C.	1,287	89	5,100	.08

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IDAHO FALLS	IDA	FANNING FIELD	IDAHO	RW	4,740	87	9,027	.21
INDIANAPOLIS	IND	INDIANAPOLIS MUNI.	IND.	AL,OZ	797	86	10,004	.32
INTERNATIONAL FALLS	INL	FALLS INTERNATIONAL	MINN.	NC	1,180	79	5,008	.31
INYOKERN	IYK	INYOKERN-KERN CO.	CALIF.	RW	2,457	103	7,315	.38
IRON MOUNTAIN	IMT	FORD	MICH.	NC	1,174	79	6,502	.70
IRONWOOD	IWD	GOGEBIC CO.	MICH.	NC	1,246	79	5,400	.08
ISLIP	ISP	ISLIP-MACARTHUR	N.Y.	AL	99	81	6,000	.17
ITHACA	ITH	TOMPKINS CO.	N.Y.	AL	1,099	84	5,801	.32
JACKSON	JXN	REYNOLDS MUNI.	MICH.	NC	1,000	84	5,278	.17
JACKSON/VICKSBURG	JAN	ALLEN C. THOMPSON FIELD	MISS.	SO,TT	345	93	8,500	.48
JACKSON	MKL	MCKELLAR FIELD	TENN.	SO	433	93	6,005	.42
JACKSON	JAC	JACKSONS HOLE	WYO	FL	6,444	82	6,305	.62
JACKSONVILLE	JAX	JACKSONVILLE INT'L	FLA	SO	29	92	8,000	.04
JACKSONVILLE	OAJ	ALBERT J. ELLIS	N.C.	PI	94	90	5,200	.05
JANESVILLE	JVL	ROCK CO.	WISC.	NC	808	85	6,701	.04
JOHNSTOWN	JST	JOHNSTOWN-CAMBRIA CO.	PA.	AL	2,284	82	5,488	.24
JONESBORO	JBR	JONESBORO MUNI.	ARK.	TT	261	93	5,599	.04
JOPLIN	JLN	JOPLIN MUNI	MO.	OZ,FL	980	91	6,505	.37
KALAMAZOO	AZO	KALAMAZOO MUNI.	MICH.	NC	874	85	5,300	.15
KALISPELL	FCA	GLACIER PARK INT'L	MONT.	RW	2,972	82	8,000	.18
KANSAS CITY	MCI	KANSAS CITY INT'L	MO.	OZ,NC,FL	1,025	91	10,801	.30
KEARNEY	EAR	KEARNEY MUNI.	NEBR.	FL	2,130	90	7,225	.04
KINSTON	ISO	STALLINGS FIELD	N.C.	PI	94	91	6,001	.14
KIRKSVILLE	IRK	CLARENCE CANNON MEM'L	MO.	OZ	966	87	6,004	.03
KLAMATH FALLS	LMT	KINGSLEY FIELD	ORE.	RW	4,092	85	10,300	.68
KNOXVILLE	TYS	MCGHEE TYSON	TENN.	PI,SO	981	90	9,000	.64
LA CROSSE	LSE	LA CROSSE MUNI	WISC.	NC	653	84	8,536	.09
LA PAZ	LAP	GEN. MANUEL MARQUEZ D.LE	MEXICO	RW	46	95	8,200	-
LAFAYETTE	LAF	PURDUE U.	IND.	AL	605	87	6,600	.09
LAFAYETTE	LFT	LAFAYETTE REGIONAL	LA.	TT	42	93	5,400	.10
LAKE CHARLES	LCH	LAKE CHARLES MUNI.	LA.	TT	16	92	6,500	.02
LAKE TAHOE	TVL	LAKE TAHOE	CALIF.	RW	6,264	75	8,544	.17
LAMAR	LAA	LAMAR MUNI	COLO.	FL	3,703	94	6,300	.45

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LANCASTER	LNS	LANCASTER	PA	AL	403	87	5,398	.50
LANSING	LAN	CAPITAL REGION	MICH.	NC	859	81	6,500	.17
LARAMIE	LAR	GENERAL BRES FIELD	WYO.	FL	7,276	79	7,700	.12
LAS VEGAS	LAS	MC CARRAN INT'L	NEV.	FL,RW	2,171	104	12,545	1.03
LAUREL	LUL	LAUREL MUNI.	MISS.	SO	238	93	5,012	.10
LAWTON	LAW	LAWTON MUNI.	OKLA.	FL	1,109	98	6,000	.34
LEWISTON	LWS	LEWISTON-NEZ PERCE CO.	IDAHO	RW	1,438	93	6,512	.20
LEWISTON	LWT	LEWISTON MUNI.	MONT.	FL	4,165	82	5,630	.8
LEXINGTON	LEX	BLUE GRASS	KY.	PI,AL	979	86	6,500	.51
LIBERAL	LBL	LIBERAL MUNI.	KAN.	FL	2,887	95	7,100	.04
LIMA	LIA	LIMA	OHIO	AL	827	87	3,500	.08
LINCOLN	LNK	LINCOLN MUNI.	NEBR	FL	1,198	92	12,900	.29
LITTLE ROCK	LIT	ADAMS FIELD	ARK.	FL,TT	257	93	7,000	.06
LONDON	LOZ	CORBIN-LONDON WAR MEM'L	KY.	PI	1,212	86	6,002	.50
LONGVIEW	GGG	GREGG COUNTY	TEXAS	TT	365	97	10,000	.15
LAREDO	LOI	LAREDO INT'L	TEXAS	TT	539	99	7,700	.77
LOS ANGELES	LAX	LOS ANGELES INT'L	CALIF.	TT,RW,PSA	126	76	12,090	.28
LOUISVILLE	SDF	STANDIFORD FIELD	KY.	OZ,PI,AL	497	89	7,800	.38
LUBBOCK	LBB	LUBBOCK REGIONAL	TEXAS	TT	3,269	92	8,500	-
LUFKIN	LFK	ANGELINA CO.	TEXAS	TT	290	95	4,805	.30
LYNCHBURG	LYH	LYNCHBURG MUNI-RGLEN FLD	VA.	PI	942	86	5,800	.64
MADISON	MSN	TRUAX FIELD	WISC.	OZ,NC	859	85	7,621	.04
MANHATTAN	MHK	MANHATTAN MUNI.	KAN	FL	1,056	93	5,500	.13
MANISTEE	MBL	MANISTEE-BLACKER	MICH.	NC	620	80	5,502	.10
MANITOWOC	MTW	MANITOWOC MUNI.	WISC.	NC	651	79	5,000	.07
MANKATO	MKT	MANKATO MUNI.	MINN.	NC	1,020	83	5,400	.04
MANSFIELD	MFD	MANSFIELD LAHM MUNI.	OHIO	AL	1,297	87	9,000	.25
MARION	MWA	WILLIAMSON CO.	ILL	OZ	471	90	6,502	.23
MARQUETTE	MQT	MARQUETTE CO.	MICH.	NC	1,419	70	6,500	.23
MASON CITY	MCW	MASON CITY MUNI.	IOWA	OZ	1,213	83	6,504	.35
MASSENA	MSS	RICHARDS FIELD	N.Y.	AL	214	81	5,000	.23
MATTOON	MTO	COLES CO. MEMORIAL	ILL	OZ,AL	721	88	5,800	.18
MAZATLAN	MZT	GEN RAFAEL BUELNA	MEXICO	RW	16	91	8,856	.

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MCALLEN	MFE	MILLER INT'L	TEXAS	TT	107	90	6,204	.18
McCOOK	MCK	McCOOK MUNI.	NEBR.	FL	2,579	92	6,000	.55
MEDFORD	MFR	MEDFORD-JACKSON CO.	ORE.	RW	1,330	89	6,700	.54
MEMPHIS	MEM	MEMPHIS INT'L	TENN.	AL,FL,TT,SO,PI	331	91	9,320	.45
MENOMINEE	MNM	MENOMINEE CO.	MICH.	NC	621	75	5,110	.32
MERIDIAN	MEI	KEY FIELD	MISS.	SO	297	93	8,004	.08
MIAMI	MIA	MIAMI INT'L	FLA.	SO	9	90	10,500	0
MIDLAND	MAF	MIDLAND-ODESSA REGIONAL	TEXAS	TT	3,870	94	8,307	.17
MILES CITY	MLS	MILES CITY	MONT.	FL	2,628	90	6,313	.07
MILWAUKEE	MKE	GEN. MITCHEL FIELD	WISC.	NC,OZ	722	79	9,916	.41
MINNEAPOLIS/ST.PAUL	MSP	MINNEAPOLIS-ST PAUL INT'L	MINN.	OZ,NC,AL	840	84	10,000	.28
MINOT	MOT	MINOT INT'L	N.D.	NC,FL	1,715	81	6,276	.48
MISSOULA	MSO	JOHNSON-BELL FIELD	MONT.	FL	1,302	90	6,700	.11
MITCHELL	MHE	MITCHELL MUNI.	S.D.	NC	1,302	90	6,700	.11
MOBILE	MOB	BATES FIELD	ALA.	SO	218	91	6,800	.09
MOLINE	MLI	QUAD-CITY	ILL.	OZ	589	88	6,505	.12
MONROE	MLU	MONROE MUNI.	LA.	SO,TT	79	94	6,000	.05
MONTEREY	MRY	MONTEREY PENINSULA	CALIF.	RW	244	75	6,600	1.39
MONTERREY	MTY	MONTERREY INT'L	MEXICO	TT	1,474	-	6,596	.
MONTGOMERY	MGM	DANNELLY FIELD	ALA.	SO	221	92	9,000	.3
MONTROSE	MTJ	MONTROSE COUNTY	COLO.	FL	5,759	91	6,999	.76
MORGANTOWN	MGW	MORGANTOWN MUNI-W.L.B HT	W.VA.	AL	1,248	86	5,200	.15
MOULTRIE/THOMASVLE	MGR	MOULTRIE-THOMASVILLE	GA.	SO	294	93	5,127	.49
MOUNT VERNON	MVN	MT VERNON-OUTLAND	ILL.	OZ	480	89	5,835	.05
MUNCIE	MIE	DELAWARE CO.-JOHNSON FLD	IND.	AL	937	87	5,156	.09
MUSCLE SHOALS	MSL	MUSCLE SHOALS	ALA.	SO	550	91	5,996	.18
MUSKEGON	MKG	MUSKEGON CO.	MICH.	NC	628	80	6,501	.08
MUSKOGEE	NKO	DAVIS FIELD	OKLA.	FL	610	95	7,200	.36
MYRTLE BEACH	CRE	MYRTLE BEACH	S.C.	PI	33	88	5,996	.04
NASHVILLE	BNA	NASHVILLE METRO.	TENN.	OZ,PI,AL,SO	597	91	8,000	.29
NATCHEZ	HEZ	HARDY-ANDERS FIELD	MISS.	SO	272	93	5,000	.20
NEWARK	EWR	NEWARK INT'L	N.J.	PI,AL,SO	18	84	9,800	.01
NEW BERN	EWN	SIMMONS NOTT	N.C.	PI	19	90	4,807	.06
NEW ORLEANS	MSY	NEW ORLEANS INT'L	LA.	TT,SO	4	91	9,227	.01
NEW YORK	JFK	J.F. KENNEDY INT'L	N.Y.	AL	12	85	14,572	0
NEW YORK	LGA	LA GUARDIA	N.Y.	NC,OZ,PI,AL,SO	21	85	7,000	.07

U.S. REGIONAL AIRLINES
AIRPORT DATA
(1972)

CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION(FT)	NORMAL MAX TEMP(°F)	EXISTING RUNWAY LENGTH(FT)	GRADIENT (SLOPE)
NEWPORT NEWS	PHF	PATRICK HENRY	VA.	PI,AL	41	86	8,003	.07
NORFOLK	OFK	KARL STEFAN MEM'L	NEBR.	NC	1,571	89	5,800	.36
NORFOLK	ORF	NORFOLK REGIONAL	VA.	RW	27	86	6,000	.12
NORTH BEND	OTH	NORTH BEND MUNI.	ORE.	RE	14	67	5,045	.09
NORTH PLATTE	LBF	LEE BIRD FIELD	NEBR.	FL	2,779	88	6,600	.09
OAKLAND	OAK	METROPOLITAN OAKLAND INTL	CALIF.	RW,PSA,XK	6	74	10,000	.01
OGDENSBURG	OGS	OGDENSBURG INT'L	N.Y.	AL	297	81	5,200	.21
OKLAHOMA CITY	OKC	WILL ROGERS WORLD	OKLA.	FL	1,294	94	9,802	.13
OLYMPIA	OLM	OLYMPIA	WASH.	RW	205	80	5,974	.24
OMAHA	OMA	EPPLEY AIRFIELD	NEBR.	NC,OZ,FL	983	90	8,501	.07
ONTARIO	ONT	ONTARIO INT'L	CALIF.	RW	952	91	9,982	.16
ONTARIO	ONO	ONTARIO MUNI	ORE.	RW	2,189	96	4,531	.09
ORLANDO	MCO	MCCOY AFB	FLA.	SO	96	92	12,000	.01
OSHKOSH	OSH	WITTMAN FIELD	WISC.	NC	795	84	6,700	.23
OTTUMWA	OTM	OTTUMWA INDUSTRIAL	IOWA	OZ	845	86	6,500	.16
OWENSBORO	OWB	OWENSBORO-DAVIESS CO.	KY.	OZ	407	90	6,498	.12
OXNARD	OXR	VENTURA CO.	CALIF.	RW	43	75	5,950	.19
PADUCAH	PAH	BARKLEY	KY.	OZ	410	92	6,504	.46
PAGE	PGA	PAGE	ARIZ	RW	4,310	97	5,499	1.22
PALM SPRINGS	PSP	PALMS SPRINGS MUNI.	CALIF.	RW,XK	448	109	7,004	.76
PALMDALE	PMD	PALMDALE	CALIF.	RW	2,542	100	12,002	.28
PANAMA CITY	PFN	PANAMA CITY-BAY CO.	FLA.	SO	20	88	6,004	.18
PARIS	PRX	COX FIELD	TEXAS	FL	547	95	4,624	.17
PARKERSBURG	PKB	WOOD CO.AIRPORTG.R.WLS	FDW.VA.	PI,AL	858	86	5,100	.73
PARSONS	PPF	TRI CITY	KAN.	FL	899	93	5,687	.60
PASCAGOULA	MOB	MOBILE ALABAMA		SO				
PASCO	PSC	TRI-CITY	WASH.	RW	406	92	5,804	.12
PASO ROBLES	PRB	PASO ROBLES MUNI	CALIF	RW	836	95	6,009	.18
PELLSTON	PLN	EMMET CO.	MICH.	NC	720	79	6,513	.13
PEORIA	PIA	GREATER PEORIA	ILL.	OZ	660	86	7,000	.37
PHILADELPHIA	PHL	PHILADELPHIA INT'L	PA.	AL	23	88	10,500	.12
PHILADELPHIA	PNE	NORTH PHILADELPHIA	PA	AL	120	85	7,000	.10
PHILIPSBURG	PSB	MID-STATE	PA.	AL	1,948	79	5,711	.66

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CITY	CODE	NAME	STATE	USERS AIRLINES	ELEVATION(FT)	NORMAL MAX TEMP (°F)	EXISTING RUNWAY LENGTH(FT)	GRADIENT (SLOPE)
PHOENIX	PHX	PHOENIX SKY HARBOR INT'L	ARIZ	FL,RW	1,128	106	10,300	.15
PIERRE	PIR	PIERRE MUNI.	S.D.	NC	1,742	89	6,894	.13
PINE BLUFF	PBF	GRIDER FIELD	ARK.	TT	206	94	5,100	.1
PITTSBURGH	PIT	GREATER PITTSBURGH INT'L	PA.	AL	1,203	83	10,500	.38
PLATTSBURGH	PLB	CLINTON CO.	N.Y.	AL	371	82	5,000	.40
POCATELLO	PIH	POCATELLO MUNI	IDAHO	RE	4,448	89	8,347	.1
PONCA CITY	PNC	PONCA CITY MUNI	OKLA.	FL	1,007	95	4,800	.13
PORTLAND	PDX	PORTLAND INT'L	ORE.	RE	26	79	8,800	.02
PROVIDENCE	PVD	THEODORE F. GREE STATE	R.I.	AL	56	82	6,465	.12
PUERTO VALLARTA	PVR	LIC. GUSTAVO DIAZ ORDAZ	MEX.	RW	10	79	9,020	.
PUEBLO	PUB	PUEBLO MEMORIAL	COLO.	FL	4,726	92	10,497	.23
PULLMAN	PUW	PULLMAN/MOSCOW REGIONAL	WASH.	RW	2,551	83	6,731	.40
QUINCY	UIN	QUINCY MUNI-BALDWIN FLD.	ILL.	OZ	769	86	7,098	.08
RALEIGH/DURHAM	RDU	RALEIGH-DURHAM	N.C.	PI	436	90	7,500	.48
RAPID CITY	RAP	RAPID CITY REGIONAL	S.D.	NC,FL	3,182	88	7,422	.56
READING	RDG	READING MUNI.	PA.	AL	343	85	6,350	.19
REDDING	RDD	REDDING MUNI	CALIF.	RW	500	85	6,996	.36
REDMOND	RDM	ROBERTS FIELD	ORE.	RW	3,077	85	6,996	.36
RENO	RNO	RENO INT'L	NEV.	RW	4,411	92	9,000	.13
RHINELANDER	RHI	RHINELANDER-ONEIDA CO.	WISC.	NC	1,608	80	5,600	.16
RICHMOND	RIC	RICHMOND EVELYN BYRD INT	VA.	PI	168	87	9,000	.09
RIVERTON	RIW	RIVERTON MUNI.	WYO.	FL	5,509	89	7,621	1.0
ROANOKE	ROA	ROANOKE MUNI.	VA.	PI	1,175	86	5,900	.31
ROCHESTER	RST	ROCHESTER MUNI.	MINN.	OZ,NC	1,316	84	7,534	.40
ROCHESTER	ROC	ROCHESTER-MONROE CO.	N.Y.	AL	560	83	8,000	.41
ROCK SPRING	RKS	ROCK SPRINGS-SWEETWATER	WYO.	FL	6,747	83	6,688	.28
ROCKFORD	RFD	GREATER ROCKFORD	ILL.	OZ	736	85	8,198	.33
ROCKY MOUNT/WILSON	RWI	ROCKY MOUNT-WILSON	N.C.	PI	158	91	5,999	.16
ROSWELL	ROW	ROSWELL INDUSTRIAL AIR C	N.M.	TT	3,669	93	13,00	.30
RUTLAND	RUT	RUTLAND STATE	VT.	AL	787	80	5,000	.24
SCRAMENTO	SMF	SCRAMENTO METRO.	CALIF	RW,PSA,XK	23	92	8,600	.03
SAGINAW	MBS	TRI CITY	MICH.	NC	667	83	6,501	.20
ST. LOUIS	STL	LAMBERT-ST LOUIS INT'L	MO.	OZ,AL,FL,SO	589	90	10,018	.41
SALINA	SLN	SALINA MUNI	KAN.	FL	1,272	94	13,331	.19
SALISBURY	SBY	SALISBURY-WICOMICO CO.	MD.	AL	51	77	5,500	.14
SALT LAKE CITY	SLC	SALT LAKE CITY INT'L	UTAH	FL,TT,RW	4,226	92	10,000	.09

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CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION(FT)	NORMAL MAX TEMP(°F)	EXISTING RUNWAY LENGTH(FT)	GRADIENT (SLOPE)
SAN ANGELO	SJT	MATHIS FIELD	TEXAS	TT	1,915	98	6,920	.32
SAN ANTONIO	SAT	SAN ANTONIO INT'L	TEXAS	TT	809	94	8,500	.35
SAN FRANCISCO	SFO	SAN FRANCISCO INT'L	CALIF.	RW,PSA,XK	10	74	10,600	.06
SAN JOSE	SJC	SAN JOSE MUNI	CALIF.	RW,PSA,XK	56	81	8,900	.29
SANTA ANA	SNA	ORANGE CO.	CALIF.	RW,XK	54	86	5,700	.28
SANTA BARBARA	SBA	SANTA BARBARA MUNI	CALIF.	RW	10	74	6,048	.02
SANTA FE	SAF	SANTA FE CO. MUNI.	N.M.	FL	6,344	85	8,322	.81
SANTA ROSA	STS	SONOMA CO.	CALIF.	RW	125	81	5,003	.16
SARINAC LAKE	SLK	ADIRONDACK	N.Y.	AL	1,659	77	5,000	.33
SAULT ST. MARIE	SSM	SAULT STE MARIE MUNI.	MICH.	NC	720	75	5,000	.41
SCOTTSBLUFF	BFF	SCOTTSBLUFF CO.	NEBR.	FL	3,965	90	8,280	.22
SEATTLE	SEA	SEATTLE-TACOMA INT'L	WASH.	RW	428	76	11,900	.72
SHELBYVILLE	SYI	SHELBYVILLE MUNI-BO MAR	TENN.	SO	800	89	5,003	.15
SHREVEPORT	SHV	SHREVEPORT REGIONAL	LA.	TT	257	94	7,300	.55
SIDNEY	SDY	SIDNEY-RICHLAND MUNI.	MONT.	FL	1,983	84	5,705	.11
SILVER CITY	SVC	SILVER CITY & GRANT CO.	N.M.	FL	5,443	89	6,408	.19
SIoux CITY	SUX	SIoux CITY MUNI.	IOWA	NC, OZ	1,097	87	9,000	.09
SOUTH BEND	SBN	ST. JOSEPT CO.	IND.	NC,AL	785	84	6,000	.23
SPOKANE	GEG	SPOKANE INT'L	WASH.	RW	2,372	82	9,000	.61
SPRINGFIELD	SPI	CAPITAL	ILL.	OZ	597	84	7,999	.13
SPRINGFIELD	SGF	SPRINGFIELD MUNI.	MO.	OZ	1,267	88	6,500	.10
PHILIPSBURG	PSB	MID-STATE	PA.	AL	1,948	79	5,711	.66
STAUNTON	SHD	SHENANDOAH VALLEY	VA.	PI	1,201	74	6,002	.42
STERLING	SQI	WHITESIDE CO.	ILL.	OZ	647	88	6,501	.09
STILLWATER	SWO	SEARCY FIELD	OKLA.	FL	984	95	5,000	.3
STOCKTON	SCK	STOCKTON METRO.	CALIF.	RW,PSA	29	93	8,650	.05
SYRACUSE	SYR	SYRACUSE HANCOCK INT'L	N.Y.	AL	421	83	9,005	.22
TALLAHASSEE	TLH	TALLAHASSEE MUNI.	FLA.	SO	81	91	6,071	.39
TEMPLE	TPL	DRAUGHON-MILLER MUNI	TEXAS	TT	682	97	6,300	.22
TERRE HAUTE	HUF	HULMAN FIELD	IND.	AL	585	88	9,025	.12
TEXARKANA	TXK	TEXARKANA MUNI.	ARK.	TT	389	95	6,601	.72
THIEF RIVER FALLS	TVF	THIEF RIVER FALLS MUNI.	MINN	NC	1,116	80	5,100	.03
THUNDER BAY	YQT		ONT.	NC	653		6,200	
TOLEDO	TOL	TOLEDO EXPRESS	OHIO	AL	684	84	8,700	.11
TOPEKA	TOP	PHILIP BILLARD MUNI.	KAN	FL	880	90	5,100	.10
TORONTO	YYZ	TORONTO INT'L	ONT.	NC,AL	10	73	11,050	.23

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CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION(FT)	NORMAL	EXISTING	GRADIENT (SLOPE)
						MAX TEMP(F°)	RUNWAY LENGTH(FT)	
TRAVERSE CITY	TVC	CHERRY CAPITAL	MICH.	NC	624	80	6,500	.28
TRENTON	TTN	MERCER CO.	N.J.	AL	213	84	5,999	.49
TUCSON	TUS	TUCSON INT'L	ARIZ	FL,RW	2,630	99	12,000	.63
TULSA	TUL	TULSA INT'L	OKLA.	OZ,FR	676	93	10,000	.23
TUPELO	TUP	C.D. LEMONS MUNI.	MISS.	SO	361	92	42,00	.17
TUSCALOOSA	TCL	TUSCALOOSA MUNI.	ALA.	SO	169	93	6,499	.17
TWINS FALLS	TWF	TWIN FALLS CITY-CO	IDAHO	RW	4,150	89	7,149	.17
TYLER	TYR	POUNDS FIELD	TEXAS	TT	544	96	5,200	.56
OXFORD	UOX	UNIVERSITY-OXFORD	MISS.	SO	451	92	4,700	.81
UTICA	UCA	ONEIDA CO.	N.Y.	AL	742	85	6,000	.56
VALDOSTA	VLD	VALDOSTA MUNI.	GA.	SO	204	92	5,600	.13
VERNAL	VEL	VERNAL	UTAH	FL	5,281	89	6,605	.20
VICTORIA	VCT	VICTORIA CO-FOSTER	TEXAS	TT	115	93	10,331	.12
WACO	ACT	WACO MUNI.	TEXAS	TT	516	97	6,597	.15
WALLA WALLA	ALW	WALLA WALLA CITY CO.	WASH.	RW	1,205	91	7,188	.64
WENATCHEE	EAT	PANGBORN FIELD	WASH.	RW	1,245	88	5,500	.30
WASHINGTON	DCA	WASHINGTON NATIONAL	D.C.	PI,AL	15	87	6,870	.03
WASHINGTON	IAD	DULLES INT'L	DC.	OZ,PI,SO	313	87	11,500	.16
WATERLOO	ALO	WATERLOO MUNI.	IOWA	OZ	873	85	8,400	.08
WATERTOWN	ART	WATERTOWN N.Y. INT'L	N.Y.	AL	325	80	5,000	.26
WATERTOWN	ATY	WATERTOWN MUNI.	S.D.	NC	1,748	83	6,899	.19
WAUSAU/MOSINEE	CWA	CENTRAL WISCONSIN	WISC.	NC	1,274	80	6,699	.24
WHITE PLAINS	HPN	WESTCHESTER CO.	N.Y.	AL	439	85	6,550	.06
WICHITA	ICT	WICHITA MUNI.	KAN.	FL	1,332	93	7,300	.01
WILKES-BARRE	AVP	WILKES-BARRE-SCRANTON	PA.	AL	956	83	6,450	.70
WILLIAMSPORT	IPT	WILLIAMSPORT-LYCOMING CO.	PA.	AL.	529	85	6,449	.19
WILLISTON	ISN	SLOULIN FIELD INT'L	N.D.	FL	1,957	86	6,041	1.25
WILMINGTON	ILG	GREATER WILMINGTON	DE.	AL	79	86	7,200	.14
WILMINGTON	ILM	NEW HANOVER CO.	N.C.	PI	31	89	8,000	.11
WINSLOW	INW	WINSLOW MUNI.	ARIZ.	FL	4,938	97	7,500	.80
WINSTON SALEM	INT	SMITH REYNOLDS	N.C.	PI	940		6,654	1.0
WOLF POINT	OLF	WOLF POINT INT'L	MONT.	FL	1,985	88	5,100	.04
WORCHESTER	ORH	WORCHESTER MUNI.	MASS.	AL	1,009	80	7,005	.36
WORLAND	WRL	WORLAND MUNI.	WYO	FL	4,245	90	7,004	.93

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CITY	CODE	NAME	STATE	USER AIRLINES	ELEVATION(FT)	NORMAL MAX TEMP (°F)	EXISTING RUNWAY LENGTH(FT)	GRADIENT (SLOPE)
WORTHINGTON	OTG	WORTHINGTON MUNI.	MINN.	NC	1,574	83	5,000	.14
YAKIMA	YKM	YAKIMA AIR TERMINAL	WASH.	RW	1,089	87	6,607	.68
YANKTON	YKN	CHAN GURNEY MUNI.	S.D.	NC	1,303	88	5,400	.62
YOUNGSTOWN	YNG	YOUNGSTOWN MUNI.	OHIO	AL	1,196	83	7,493	.88
YUMA	YUM	YUMA MCAS/YUMA INT'L	ARIZ.	RW	213	107	13,300	.07
BLUEFIELD	BLF	MERCER CO.	W.VA.	PI	2,857	87	4,743	.30
CALGARY	YYC	CALGARY INT'L	ALTA.	RW	3,557	66	12,700	.11
CROSSVILLE	CSV	CROSSVILLE MEMORIAL	TENN.	SO	1,881	85	5,419	.28
GLENS FALLS	GFL	WARREN CO.	N.Y.	AL	328	88	5,007	.10
JAMES TOWN	JHW	CHAUTAUQUA CO.	N.Y.	AL	1,723	83	5,300	.25
KEENE	EEN	DILLANT-HOPKINS	N.H.	AL	487	82	6,502	.27
KINGMAN	IGM	KINGMAN MUNI	ARIZ.	RW	3,446	98	6,830	.25
LAKE HAVASU CITY	LHU	LAKE HAVASU CITY	ARIZ.	RW	482	108	6,434	.05
LAKE OF THE OZARKS	AIZ	KAISER/LAKE OZARK	MO.	OZ	869	91	6,500	.09
MEXICO CITY	MEX	LIC. BENITO JUAREZ	MEXICO	TT	7,340	73	10,824	.
MONTREAL	YUL	MONTREAL INT'L	QUE	AL	117	73	11,000	.09
NEW HAVEN	HVN	TWEED-NEW HAVEN	CONN.	AL	13	81	5,600	.16
NEW LONDON	GON	TRUMBULL	CONN.	AL	10	81	5,000	.04
SAN DIEGO	SAN	SAN DIEGO INT'L	CALIF.	RW, PSA, XK	15	77	9,400	.02
HAYDEN	HDN	YAMPA VALLEY	COLO	FL	6,595	86	7,000	.02
WEST YELLOWSTONE	WYS	YELLOWSTONE ARPT	MONT	FL	5,644	80	8,401	.17

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U.S. REGIONAL AIRLINES
CORRECTED AIRPORT DATA
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CITY	CODE	NAME	STATE	USER AIRLINES	EXISTING RUNWAY LENGTH (FT)	CORRECTED LENGTH (85% RELIABILITY)(FT)
ALAMOSA	ALS	ALAMOSA, MUNI	COLO	FL	7,872	4,349
ALTOONA/MARTINSBURG	AOO	BLAIR CO.	PA	AL	5,465	4,225
ANDERSON	AND	ANDERSON CO.	S.C.	SO	5,001	4,122
ANNISTON	ANB	ANNISTON-CALHOUN CO.	ALA	SO	5,009	4,126
APPLE VALLEY	APV	APPLE VALLEY NEW	CAL	RW	6,498	3,929
ATHENS	AHN	ATHENS MUNI	GA	SO	4,992	3,817
BECKLEY	BKW	RALEIGH CO. MEM'L	W. VA.	PI	5,000	3,607
BENTON HARBOR	BEH	ROSS FIELD	MICH	NC	5,107	4,412
BIG SPRING	HCA	HOWARD CO.	TEX	TT	5,494	3,731
BLOOMINGTON	BMG	MONROE CO.	IND	AL	5,202	4,361
BRAINERD	BRD	BRAINERD-CROW WING CO.	MINN	NC	5,000	4,283
BRIDGEPORT	BDR	IGOR SIKORSKI MEM'L	CONN	AL	4,761	4,423
BROOKINGS	BKX	BROOKINGS MUNI	S.D.	NC	5,431	4,258
BROWNWOOD	BWD	BROWNWOOD MUNI	TEXAS	TT	5,598	4,223
CEDAR CITY	CDC	CEDAR CITY MUNI	UTAH	RW	6,100	3,506
CHADRON	CDR	CHADRON MUNI	NEB	FL	6,000	4,063
CLARKSBURG	CKB	BENEDUM	W. VA.	AL	5,200	4,460
CLARKSVILLE	CKV	OUTLAW FIELD	TENN	OZ	5,000	4,058
CODY	COD	CODY MUNI	WYO	FL	7,107	4,360
COLLEGE STATION	CLL	EASTWOOD FIELD	TEX	TT	5,161	4,341
COLUMBUS	OLU	COLUMBUS MUNI	NEB	FL	5,002	4,025
CORTEZ	CEZ	CORTEZ-MONTEZUMA CO.	COLO	FL	7,205	4,279
DANVILLE	DNV	VERMILLION CO.	ILL	AL	5,400	4,278
DANVILLE	DAN	DANVILLE MUNI	VA	PL	5,000	4,123
DUBOIS	DUJ	DUBOIS-JEFFERSON CO.	PA	AL	5,505	4,419
DURANGO	DRO	DURANGO-LA PLATA CO.	COLO	FL	8,000	4,244
ELDORADO/CAMDEN	ELD	GOODWIN FIELD	ARK	TT	5,099	4,304
ELKINS	EKN	ELKINS-RANDOLPH CO.	W. VA.	AL	4,542	3,282
FAIRMONT	FRM	FAIRMONT MUNI	MINN	NC	5,002	4,146
FLAGSTAFF	FLG	PULLIAM	ARIZ	FL	7,000	3,895
FORT DODGE	FOD	FORT DODGE MUNI	IOWA	OZ	4,400	3,534

U.S. REGIONAL AIRLINES
CORRECTED AIRPORT DATA
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FORT LEONARDWOOD	TBN	FORNEY AAF	MO	OZ,FL	5,037	4,085
FRANKLIN	FKL	CHESS-LAMBERTON	PA	AL	5,200	4,154
GADSDEN	GAD	GADSDEN	ALA	SO	4,815	3,993
GARDEN CITY	GCK	GARDEN CITY MUNI	KAN	FL	6,000	4,241
GLENDIVE	GDV	DAWSON COMMUNITY	MONT	FL	5,700	4,266
GOLDSBORO	GSB	GOLDSBORO-WANE MUNI	NC	PI	3,698	3,310
GOODLAND	GLD	RENNERFIELD/GOODLAND MUNI	KAN	FL	5,500	3,683
GREENBRIER/LEWISBURG	LWD	GREENBRIER VALLEY	W. VA.	PL	6,000	4,395
GREENWOOD	GWO	GREENWOOD-LE FLORE	MISS	SO	4,996	4,301
GREENWOOD	GRD	GREENWOOD CO.	SC	SO	5,212	4,296
GUNNISON	GUC	GUNNISON CO.	COLO	FL	7,200	3,869
HASTINGS	HSI	HASTINGS MUNI	NEBR	FL	5,600	4,200
HAVRE	HVR	HAVRE CITY CO.	MONT	FL	5,200	3,920
HAYS	HYS	HAYS MUNI	KAN	FL	5,700	4,298
HAZLETON	HZL	HAZLETON MUNI	PA	AL	4,900	4,398
HOT SPRINGS	HSP	INGALLS FIELD	VA	PI	5,602	3,706
HUNTINGTON	HTS	TRI-STATE/WALKER-LONG FIELD	W. VA	PI,AL	5,281	4,498
HURON	HON	W.W. HOWES MUNI	S.D.	NC	5,100	4,227
INTERNATIONAL FALLS	INL	FALLS INTERNATIONAL	MINN	NC	5,008	4,289
JACKSON	JXN	REYNOLDS MUNI	MICH	NC	5,278	4,459
JACKSON	JAC	JACKSONS HOLE	WYO	FL	6,305	3,589
JOHNSTOWN	JST	JOHNSTOWN-CAMBRIA CO.	PA	AL	5,488	4,123
KALAMAZOO	AZO	KALAMAZOO MUNI	MICH	NC	5,300	4,491
LAMAR	LAA	LAMAR MUNI	COLO	FL	6,300	4,071
LARAMIE	LAR	GENERAL BREES FIELD	WYO	FL	7,700	4,328
LAUREL	LUL	LAUREL MUNI	MISS	SO	5,012	4,303
LEWISTON	LWT	LEWISTON MUNI	MONT	FL	5,630	3,558
LIMA	LIA	LIMA	OHIO	AL	3,500	3,025
LUFKIN	LFK	ANGELINA CO.	TEXAS	TT	4,805	3,940
MANHATTAN	MHK	MANHATTAN MUNI	KAN	FL	5,500	4,459
MANITOWOC	MTW	MANITOWOC MUNI	WISC	NC	5,000	4,432
MC COOK	MCK	MC COOK MUNI	NEBR	FL	6,000	4,222
MENOMINEE	MNM	MENOMINEE CO.	MICH	NC	5,110	4,472
MONTROSE	MTJ	MONTROSE CO.	COLO.	FL	6,999	3,936

U.S. REGIONAL AIRLINES
CORRECTED AIRPORT DATA
(1972)

CITY	CODE	NAME	STATE	USER AIRLINES	EXISTING RUNWAY LENGTH (FT)	CORRECTED LENGTH (85% RELIABILITY)(FT)
MORGANTOWN	MGW	MORGANTOWN MUNI-W.L.S. HART	W. VA	AL	5,200	4,275
MOULTRIE/THOMASVILLE	MGR	MOULTRIE-THOMASVILLE	GA	SO	5,127	4,237
MUNCIE	MIE	DELAWARE CO.-JOHNSON FLD.	IND	AL	5,156	4,333
NATCHEZ	HEZ	HARDY-ANDERS FLD.	MISS	SO	5,000	4,220
NEW BERN	EWN	SIMMONS NOTT	N.C.	PI	4,807	4,279
ONTARIO	ONO	ONTARIO MUNI	ORE	RW	4,531	3,450
PAGE	PGA	PAGE	ARIZ	RW	5,499	3,341
PARIS	PRX	COX FIELD	TEXAS	FL	4,624	3,810
PARKERSBURG	PKB	WOOD CO.-G.R. WILSON FIELD	W. VA.	PI,AL	5,100	4,180
PARSONS	PPF	TRI CITY	KAN.	FL	5,687	4,483
PHILIPSBURG	PSB	MID-STATE	PA	AL	5,711	4,268
PINE BLUFF	PBF	GRIDER FIELD	ARK	TT	5,100	4,430
PLATTSBURGH	PLB	CLINTON CO.	N.Y.	AL	5,000	4,414
PONCA CITY	PNC	PONCA CITY MUNI	OKLA	FL	4,800	3,839
RIVERTON	RIW	RIVERTON MUNI	WYO	FL	7,621	4,317
ROCK SPRINGS	RKS	ROCK SPRINGS-SWEETWATER CO.	WYO	FL	6,688	3,824
RUTLAND	RUT	RUTLAND STATE	VT	AL	5,000	4,329
SANTA ROSA	STS	SONOMA CO.	CALIF	RW	5,003	4,170
SARINAC LAKE	SLK	ADIRONDACK	NY	AL	5,000	4,036
SAULT ST. MARIE	SSM	SAULT ST. MARIE MUNI	MICH	NC	5,000	4,406
SHELBYVILLE	SYI	SHELBYVILLE MUNI	TENN	SO	5,003	4,115
SIDNEY	SDY	SIDNEY-RICHLAND MUNI	MONT	FL	5,705	4,422
SIDNEY	SNY	SIDNEY MUNI	NEBR	FL	6,600	4,210
STILLWATER	SWO	SEARCY FIELD	OKLA	FL	5,000	3,941
THIEF RIVER FALLS	TVF	THIEF RIVER FALLS MUNI	MINN	NC	5,100	4,471
TOPEKA	TOP	PHILIP BILLARD MUNI	KAN	FL	5,100	4,207
TUPELO	TUP	C.D. LEMONS MUNI	MISS	SO	4,200	3,530
TYLER	TYR	POUNDS FIELD	TEXAS	TT	5,200	4,144
OXFORD	UOX	UNIVERSITY-OXFORD	MISS	SO	4,700	3,687
VERNAL	VEL	VERNAL	UTAH	FL	6,605	4,027
WENATCHEE	EAT	PANGBORN FIELD	WASH	RW	5,500	4,456
WATERTOWN	ART	WATERTOWN N.Y.	NY	AL	5,000	4,290
WILLISTON	ISN	SLOULIN FIELD INT'L	ND	FL	6,041	4,394
WINSLOW	INW	WINSLOW MUNI	ARIZ	FL	7,500	4,344
WOLF POINT	OLF	WOLF POINT	MONT	FL	5,100	4,053

U.S. REGIONAL AIRLINES
CORRECTED AIRPORT DATA
(1972)

CITY	CODE	NAME	STATE	USER AIRLINES	EXISTING RUNWAY LENGTH (FT)	CORRECTED LENGTH (85% RELIABILITY)(FT)
WORLAND	WRL	WORLAND MUNI	WYO	FL	7,004	4,293
YANKTON	YKN	CHAN GURNEY MUNI	SD	NC	5,400	4,282
BLUEFIELD	BLF	MERCER CO.	W. VA.	PI	4,743	3,363
CROSSVILLE	CSV	CROSSVILLE MEM'L	TENN	SO	5,419	4,128
JAMESTOWN	JHW	CHAUTAUQUA CO.	NY	AL	5,300	4,192
HAYDEN	HDN	YAMPA VALLEY	COLO	FL	7,000	4,000

APPENDIX C - ECONOMICS

C.1 COMMERCIAL AIRCRAFT PRODUCTION AND DEVELOPMENT COST ESTIMATES

Table C-1, "Basepoint Design Aircraft Cost Estimates", lists the essential input factors to the CAPDEC on the first page. Also shown are estimates of components of the development cost and the total amount in millions of dollars. The data shown are for the 50 passenger, 850 nautical mile range basepoint aircraft created in the design study phase. The second page presents unit, cumulative and average costs as a function of numbers of aircraft produced. The 400th pricing unit is underlined.

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JR JET - SEPTEMBER 12
RUN 4

TABLE C-1
BASEPOINT DESIGN AIRCRAFT COST ESTIMATES

	USER	INITIALIZED	INPUT	DATA		
	USER	PARAMETRIC	INPUT	DATA		
26	MFG WT EMPTY - 1000 LB	= 26.685	27	ROLLING ASSEMBLY WT - 1000 LB (4)	=	0.765
29	WEIGHT PER ENGINE	= 1.685	32	AVIONICS FLAG (3)	=	0.0
33	AVIONICS WEIGHT - 1000 LB (11)	= 0.436	34	AVIONICS COST - \$M (11,14)	=	0.125
37	HIGH SPEED CRUISE (MACH NO)	= 0.680	18	HOURLY COST ESCAL. PERCENT/YR (9,13)	=	6.000
19	MATERIAL COST ESCAL. - PERCT/YR (9,13)	= 5.000	24	AIRLINE PRE-PAYMENT - YES=0, NO=1	=	1.000
40	TECHNICAL FACTOR - ENGINEERING (1)	= 0.605	41	TECHNICAL FACTOR - TOOLING (1)	=	0.745
42	TECHNICAL FACTOR - FLIGHT TEST (1)	= 0.636	43	TECHNICAL FACTOR - DEV. SUPPORT (1)	=	0.536
46	TECHNICAL FACTOR - PERM. MFG LABOR (1)	= 0.836	47	TECHNICAL FACTOR - MATERIALS (1)	=	0.814
8	PROFIT - PERCENT OF TOTAL COST	= 10.000	14	PRICING UNIT (INCLUDES PROFIT) (8)	=	400.000
31	ENGINE COST - \$M (12,14)	= 0.341	23	CONSTANT DOLLAR YEAR (NO = 0) (18)	=	1974.500

THIS IS A SINGLE NEW AIRCRAFT PROGRAM

AIRFRAME DEVELOPMENT COSTS *

(MILLIONS OF DOLLARS)

INITIAL ENGINEERING	INITIAL TOOLING	DEVELOPMENT SUPPORT	TEST FLIGHT	PROGRAM LAB	EXTRODINARY DEVELOPMENT	TOTAL
30.34	31.95	13.83	26.52	6.07	0.0	108.70

* EXCLUDING THRUPUTS, INVESTMENT AND WORKING CAPITAL COSTS, AND PROFITS
COST ESCALATION PRORATED PROPORTIONATELY AMONG THE COST ELEMENTS

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AIRCRAFT COSTS AND PROFITS

(MILLIONS OF DOLLARS)

PRODUCTION QUANTITY	RATE PROD	CUM COSTS			UNIT COSTS	CUM AV COSTS	REVENUE TOTAL UNIT	PROFIT	
			DEVEL	INTEREST	TOTAL					CUM AV	TOTAL
1	1.0	7.	109.	14.	129.	0.0	128.79	3.	0.0	-125.60	-126.
3	1.0	25.	109.	15.	148.	9.70	49.39	10.	-6.51	-46.21	-139.
5	1.0	38.	109.	16.	162.	7.13	32.49	16.	-3.95	-29.31	-147.
10	1.0	65.	109.	18.	191.	5.70	19.09	32.	-2.51	-15.91	-159.
20	3.6	106.	109.	27.	242.	5.06	12.08	64.	-1.88	-8.89	-178.
30	4.8	142.	109.	27.	277.	3.55	9.24	95.	-0.37	-6.05	-182.
40	5.7	174.	109.	32.	315.	3.76	7.87	127.	-0.57	-4.68	-187.
50	6.0	204.	109.	37.	350.	3.58	7.01	159.	-0.39	-3.83	-191.
60	8.0	233.	109.	37.	379.	2.87	6.32	191.	0.32	-3.13	-188.
70	8.0	260.	109.	43.	412.	3.30	5.89	223.	-0.12	-2.70	-189.
80	8.0	287.	109.	43.	439.	2.66	5.48	255.	0.53	-2.30	-184.
90	8.0	313.	109.	43.	464.	2.58	5.16	286.	0.60	-1.98	-178.
100	8.0	338.	109.	48.	495.	3.03	4.95	318.	0.15	-1.76	-176.
120	8.0	387.	109.	53.	548.	2.68	4.57	382.	0.51	-1.39	-166.
140	8.0	434.	109.	53.	595.	2.35	4.25	446.	0.84	-1.07	-150.
160	8.0	479.	109.	57.	645.	2.50	4.03	509.	0.68	-0.85	-136.
180	8.0	523.	109.	61.	694.	2.42	3.85	573.	0.76	-0.67	-121.
200	8.0	567.	109.	65.	741.	2.35	3.70	637.	0.83	-0.52	-104.
220	8.0	609.	109.	68.	786.	2.28	3.57	700.	0.90	-0.39	-86.
250	8.0	672.	109.	71.	851.	2.17	3.41	796.	1.01	-0.22	-56.
300	8.0	774.	109.	74.	957.	2.11	3.19	955.	1.08	-0.01	-2.
350	4.0	873.	109.	75.	1057.	2.01	3.02	1114.	1.17	0.16	57.
400	4.0	971.	109.	78.	1158.	2.02	2.90	1273.	1.16	0.29	115.
450	4.0	1068.	109.	81.	1258.	1.99	2.79	1432.	1.19	0.39	175.
500	4.0	1164.	109.	84.	1356.	1.97	2.71	1591.	1.22	0.47	235.
550	4.0	1258.	109.	87.	1454.	1.95	2.64	1751.	1.23	0.54	297.
600	4.0	1353.	109.	89.	1551.	1.95	2.59	1910.	1.23	0.60	358.
650	4.0	1448.	109.	93.	1649.	1.96	2.54	2069.	1.22	0.65	420.
700	4.0	1542.	109.	96.	1747.	1.94	2.50	2228.	1.24	0.69	481.
750	4.0	1637.	109.	98.	1844.	1.94	2.46	2387.	1.24	0.72	543.
800	4.0	1731.	109.	101.	1941.	1.94	2.43	2546.	1.24	0.76	606.
850	4.0	1825.	109.	104.	2038.	1.94	2.40	2705.	1.24	0.79	668.
900	4.0	1919.	109.	107.	2134.	1.94	2.37	2865.	1.25	0.81	730.
950	4.0	2013.	109.	110.	2232.	1.95	2.35	3024.	1.23	0.83	792.

AIRCRAFT DELIVERY - PRICE SCHEDULE

1977 - 94. A/C AT \$ 3.18M	1978 - 96. A/C AT \$ 3.18M	1979 - 96. A/C AT \$ 3.18M	1980 - 76. A/C AT \$ 3.18M
CUM - 94. A/C AT \$ 3.18M	CUM - 190. A/C AT \$ 3.18M	CUM - 286. A/C AT \$ 3.18M	CUM - 362. A/C AT \$ 3.18M
1981 - 48. A/C AT \$ 3.18M	1982 - 48. A/C AT \$ 3.18M	1983 - 48. A/C AT \$ 3.18M	1984 - 48. A/C AT \$ 3.18M
CUM - 410. A/C AT \$ 3.18M	CUM - 458. A/C AT \$ 3.18M	CUM - 506. A/C AT \$ 3.18M	CUM - 554. A/C AT \$ 3.18M

C.2 RETURN ON INVESTMENT ANALYSIS

Table C-2 presents the results of an illustrative analysis of ROI with a machine program. The assumptions and input data are listed on the first page. Revenue and cost input data in dollars per mile are shown on the second page. A computed rate of return on investment is reproduced as a series of data points by year is shown in Figure C-1. It was assumed that the aircraft entered service in 1975.

These data sheets are typical of those generated in the ROI of the 30 and 70 passenger medium density basepoint aircraft reported in Section 15.1.

TABLE C-2
BASEPOINT DESIGN AIRCRAFT RETURN ON INVESTMENT
JR JET. ***** ROI ***** 50 SEATS, AUGUST 6

AIRCRAFT ASSUMPTIONS

DELIVERY DATE 6/1974
ECONOMIC LIFE 15 YEARS

	1 AIRCRAFT	SPARES	GROUND SUPPORT EQUIPMENT
TOTAL PRICE	2990000.	0.	0.
DEPRECIABLE LIFE	15 YEARS	0 YEARS	0 YEARS
RESIDUAL PERCENTAGE	15.0	0.0	0.0
START UP COSTS	37500.		
POSSIBLE I.T.C.	209300.		

DEPRECIATION METHOD (FOR AIRCRAFT) -- STRAIGHT LINE

INCOME TAX RATE 48.0 PERCENT
DISCOUNT RATE FOR NEGATIVE CASH FLOWS 10.0 PERCENT

BLOCK SPEED	319.	319.	319.	319.	319.	319.	319.	319.	319.	319.
PASSENGER SEATS PER AIRCRAFT	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
ANNUAL PASSENGER UTILIZATION (HOURS)	2845.	2845.	2845.	2845.	2845.	2845.	2845.	2845.	2845.	2845.
PASSENGER LOAD FACTOR (PERCENT)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

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REVENUE AND COST ASSUMPTIONS

12 MONTHS ENDING *****	PER RPM *****		PER MILE *****		PER MILE *****	
	YIELD *****	GROWTH RATE *****	DOC *****	GROWTH RATE *****	IOC *****	GROWTH RATE *****
5/31/75	0.1420		1.2300		2.0500	
5/31/76	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/77	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/78	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/79	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/80	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/81	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/82	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/83	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/84	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/85	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/86	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/87	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/88	0.1420	0.0	1.2300	0.0	2.0500	0.0
5/31/89	0.1420	0.0	1.2300	0.0	2.0500	0.0

DEBT REPAYMENT ASSUMPTIONS

NO COMPUTATIONS REQUESTED FOR THIS CASE

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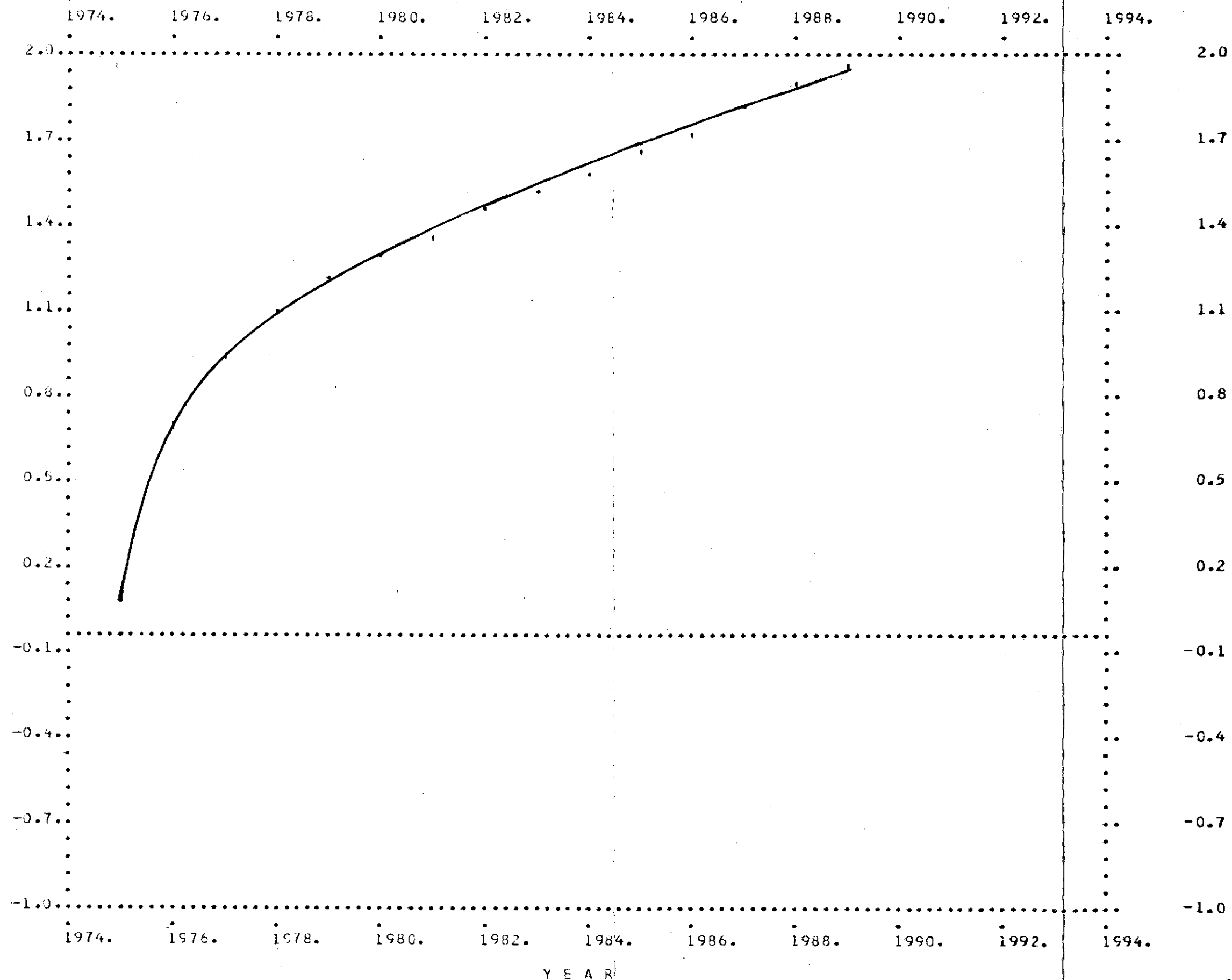


Figure C-1 - RATE OF RETURN BY YEAR - 50 PASSENGER BASEPOINT AIRCRAFT

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